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F R Forbes

Collection and Field Note Book

No. 48

(Nov. 18, 1956 - August 5, 1957)

(38663 -- 38813)

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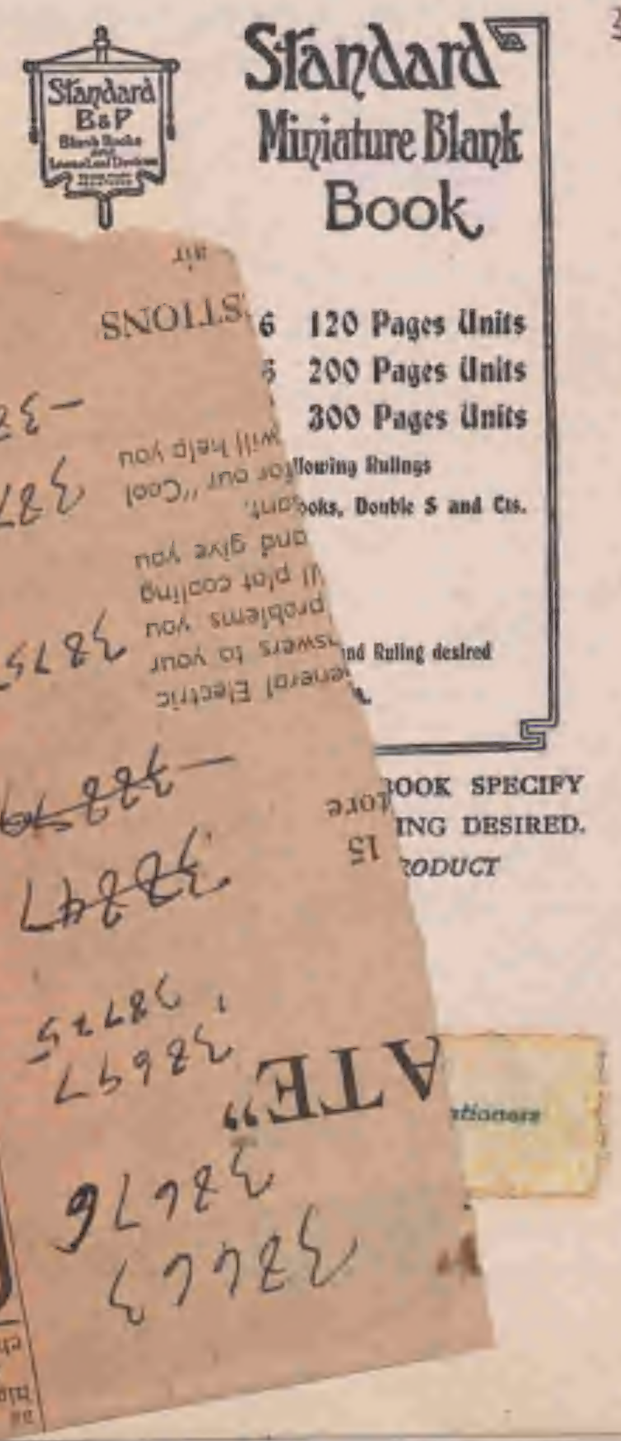

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BUDAPEST, Hungary, May 10 (AP). — Poland's Wladyslaw Gomulka told a select group of Communists today Soviet suppression of the Hungarian revolt in 1956 was correct and necessary.

"In the concrete circumstances of your country at the time it was an international obligation on the part of the USSR in the interests of the Hungarian people, peace and all the Socialist states," the Polish Communist Party boss said.

Mr. Gomulka, here on a four-day visit, spoke in a sweltering indoor sports hall and the 4,000 who heard him were admitted by numbered tickets. A few hundred yards away stands the great People's Stadium, which can hold nearly 100,000 people.

There was speculation that the Hungarian Communist leaders wanted no large and unscreened crowd to hear Mr. Gomulka, who seeks for his

TONIC

on new power lively channel

5:30

Michel's Continental Music

Enchanting gypsy and concert music

7:00

ADVENTURES NUMBER & SPA

Bill Baird's marionette "Stretching the Imagina

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Nov. 18 - Trip by rail from Washington to New York. Description of vegetation from left side windows of train (Pennsylvania R.R.) (Coastal Plain landscape)

Leaving Washington - weedy embankments and waste places, some dominated by blankets of Lonicera japonica, others by stands of Andropogon virginicus and D. scoparius, still others by mixed perennial pioneer species eg. Solidago, Panicum, Aster etc.

Deciduous thickets with Acer rubrum, Liquidambar, Quercus spp. etc. rarely a few Pinus virginiana more and more common, Acer is especially common in low spots. Lonicera is very conspicuous climbing in trees.

Outside Washington the country becomes generally wooded except where occupied by housing developments.

1956 Md.

Woods are predominantly oak with Platanus and Acer rubrum in low places. Admixtures of pine, mainly P. virginiana but some P. rigida, are common. Some patches of pure stands of pines. Leaves mostly off the deciduous trees at this time, but a few trees still show some color, some have brown leaves, especially oaks.

Seabrook Sta.

Large sort of mixture, with less housing.

Glenn Dale Sta.

Beyond here are more pure stands of pine, then mixed deciduous woods, largely young second growth, but occasional patches are fairly large.

Bowie Sta.

Much very young second growth, mostly deciduous, some stands of pine, 4-8 m tall.

Md.

This country is a

occasional low spots of

2 1956 Md.

Woods are predominantly oak with Platanus and Acer rubrum in low places. Admixture of pine, mainly virginiana but some rigida, are common. Some patches of pure stands of pines. Leaves mostly off the deciduous trees at this time, but a few trees still show some color, some have brown leaves, especially oaks.

Seabrook Md.

Large part of mixture, with less browning.

Glenn Dale Md.

Beyond here are more pure stands of pine, then mixed deciduous woods, largely young second growth, but occasional patches are fairly large.

Bowie Md.

Much very young second growth, mostly pines; some stands of pine, 4-5 m tall.

ABOUT OUR PEACHES

These peaches are grown on our farm in Fairfax County and are picked the morning of the day you buy them. By picking daily we are able to bring them to you at the peak of their freshness and goodness. Only a tree-ripened peach has these qualities.

The orchard we are picking from this year has eleven varieties, with ripening dates ranging from July to September.

The varieties were chosen because of their high quality for eating fresh. Most of them are also suitable for freezing or canning. You will notice that the Elberta is missing from the list below, but its absence is intentional. The Elberta (often mispronounced Alberta) is an old variety good for canning but definitely inferior for eating fresh or freezing. It is still a popular commercial peach because it ships well and can be handled roughly. But it is not "luscious", as store ads frequently describe it.

Incidentally, we also grow several varieties of Oriental plums -- Satsuma, Methley, Abundance, and Santa Rosa -- which will be available at this stand at times during the summer. All will be sweet and juicy -- again, as in the case of peaches, because they will be left on the tree until ripe.

Following is a list of the varieties of peaches to be sold at this stand throughout the summer. Approximate ripening date is given for each variety. These dates may vary a few days either way, depending on the weather. Each variety is in for about a week after its ripening date.

Variety	Approx. Ripening Date
Erly-Red-Fre	July 9
Gold Ray	July 9
Redhaven	July 20
Triogem	July 29
Halehaven	Aug. 7
Georgia Belle	Aug. 13
Summercrest	Aug. 16
Brilliant	Aug. 17
Shippers Red	Aug. 20
Afterglow	Sept. 1
Rio Oso Gem	Sept. 6

MOUTOUX ORCHARD

1956 Md.

Woods are predominantly oak, with Castanea and Acer rubrum in low places. Admixtures of pine, mainly P. virginiana but some P. rigida, are common. Some patches of pure stands of Pinus. Leaves mostly off the deciduous trees at this time, but a few trees still show some color, some have brown leaves, especially oaks.

Seabrook Sta.

Large part of mixture, with less housing.

Glenn Dale Sta.

Beyond here are more pure stands of pine, then mixed deciduous woods, largely young second growth, but occasional patches are fairly large.

Bowie Sta.

Much very young second growth, mostly Quercus; some stands of pine, 4-8 m. tall.

This country is a patchwork of second growth - old field successions - in various stages of development, some pure pine, mostly mixed deciduous. A large patch of swamp forest several miles from Bowie, then several more, with Betula nigra, are well as Acer rubrum and oaks. Some places, where the construction of railroad or road have ponded the water, show Taxodium fairly dead. Betula may be identified by pink bark, very scaly, and darker smaller branches.

After this some rather good pure forests of medium low stature. On rolling hills a mosaic of pine patches and well developed deciduous forest, occasional cultivated patches, occasional low spots of

swamp or bottom-land forest.

after 2000 miles of this open land, either cultivated or grassy becomes more predominant, but still with considerable forest, some park-like landscape. Open land is mostly dominated by Andropogon virginicus.

A thicket of Amsonia brt. n.p. 107 & 106.

The country then becomes more generally wooded. Liriodendron is very common, also Platanus in low places.

Calvert Distillery

Much hardwood, with some deciduous woods, this becoming less as Baltimore is approached. In large cemetery trees are largely native deciduous ones. shrubs are mostly planted.

Govans Rte.

Entrance to Baltimore has little vegetation except weedy ruderal sites with Solidago, Panicum, Eupatorium, aster, Triodens, etc. Scattered tree seedlings of Ulmus, Prunus, Platanus, ~~etc~~ Ailanthus, etc.

Leaving Baltimore Weedy vacant lots and ruderal spots. Some marshy, very polluted places, dominated by Panicum virgatum.

Then some cultivated fields mixed with low patches of deciduous second growth.

A narrow estuarine marsh (more extensive on right side) Then a mosaic of cultivated fields with small patches of broad-leafed woods of various heights. Some of these are blanketed by Lonicera japonica.

Glenn Martin Plant (on rt.)

Woods become more dominant, mostly well grown second growth deciduous, but

with more and more
pine admixed, both
P. rigida and P. virginiana.
Berries Rta.

Continues the same,
with some farms
and patches of young
recent growth. Some
areas Andropogon near
Chase Rta
Then some well
developed oak forest,
followed by a mosaic
of younger second growth,
housing, etc.
Then a large estuary
lined by irregular
lobed areas of marsh,
probably largely Panicum
virgatum but too
far away to be sure.
Low gradually ~~[illegible]~~
with scrubby second
growth, patches of
good deciduous woods,
very few pines. Some
farms.
Quercus phellos fairly
common, with various
other oaks.
Edgewood Rta.
Same sort of terrain,
on flatter ground. Where

it is at all rolling
pine becomes more
prominent for a
short distance, then
almost drops out.
Another large
estuary, with very
little marsh, higher
wooded shores, but
mostly solidly lined
with houses, piers, etc.
Uneven deciduous
woods, oak with
some red maple, especially
in low place.
Then some large
cultivated areas with
patches of deciduous
wood, many houses
surrounded by trees,
almost flat. Much
Lonicera japonica especially
in margins of woods
and in hedgerows.
More or less like this
to Aberdeen. Fields
tend to be separated
by hedge-rows and
lanes with scrubby
trees, juniper, Lonicera.
Young second-growth
becomes more abundant
especially small
thickets.

Slopes around
Havre-de-Grace are
covered by thin scrubby
second growth, this
facing Susquehanna R.
other not disturbed by
houses. Small bits
of Panicum virgatum
marsh. Island in
river covered by bottom-
land type.
Beyond Perryville
patches of deciduous
wood in farm-land.
A long hedge of Myrica
cuts off view for a
while. Rolling
hillsides mostly
wooded largely oak
and Liriodendron with
Platanus prominent in
ravines.
Cut banks along
rail road revegetated
in places by a solid
stand of pines. (P. virginiana)
From here an irregular
mosaic of patches of
clearing in deciduous
woods locally mixed
with pine. Occasional
small swamps and
wet places with
Betula nigra. Openings

dominated by Andropogon
virginicus.
Some larger cultivated
farms.
A mixed shrub layer
becomes more frequent
in the woods. And
patches of Betula
nigra or apparently
dry ground are
occasional, a few
patches of pine, either
pure or mixed with
deciduous trees. Pines
are mostly P. virginiana,
some P. rigida.
Around m.p. 46 are
large open areas, either
covered by Andropogon
or cultivated.
Elkton Md.
Deciduous woods
along streams, in
escarpments and
then a large area on
a low hill. Mostly oak.
Open ground cultivated
or in Andropogon.
Mostly open. Lower,
probably Rhus copallina,
common in waste spots,
with mixture of
Solidago, Andropogon, etc.
Newark, Del.

1956 Delaware

Rolling land, mostly
open fields, some
patches of deciduous
wood, Quercus-Liriodendron,
some Acer rubrum.
Patches of well-grown
deciduous woods
with an understory
of small oaks.
Some abandoned, apparently
frequently flooded land
with scattered trees
in grass, then a young pine
plantation, near rm. p. 22,
then a small estuarine
marsh.
Housing dominant
but not excessive
around Newport.
Patches of deciduous
woods and large
fields of Andropogon.
Housing, estuarine
marshes, city dumps,
etc. as Wilmington
is approached. In
outskirts a small
Phragmites marsh.
City has few trees, but
some Ailanthus to be
seen near railroad.
Large London Plane trees
around cemetary just
beyond station.

Ailanthus in alleys, etc.
In edge of city an
area of dump is being
revegetated.
Probably second growth
and small patches of
estuarine marsh -
some with Typha, some
Hibiscus moscheutos, etc.
Beyond this, rolling
clayey running down
to Delaware river - largely
housing, some deciduous
second growth.
Bellevue Sta.
Housing with patches
of deciduous woods very
irregular and poor
estuarine marsh
and Andropogon.
Woods are oak, red maple,
Platanus, Liquidambar, etc.
Just before Claymont
Steel Plant at Marcyman,
Miscanthus sinensis
has grown a foothold.
Then weedy area
being repopulated
with tree seedlings,
these 1 m. ± tall.
Marcus Hook area
largely housing and
factories but with
patches of marsh, wood,

etc. Housing more and more dominates landscape
into Chester
Between Chester and Philadelphia housing
near largely dominate
but many with
good growth of trees.
Occasional nice patches
of deciduous woods,
especially on rough ground
Waste spots and cut
banks very weedy,
Fennel, Japanese, quite
common. Some patches
of Sassafras saplings;
also Prunus and Ailanthus.
Chenopodium, Rubus, Solanaceae,
Solidago, Lespedeza, Andropogon.
Just before 70th St. Sta.
is Woodland Cemetary
with many fine old
trees.
Little vegetation except
weedy banks and Ailanthus
trees between 70th St. and
North Philadelphia. Some
London Plane trees just
before North Philadelphia
After North Philadelphia,
for some distance an
industrial area with
little except ruderal
vegetation

After Frankford there
is a change to a largely
residential area, with
more trees, but still
very little vegetation.
Some patches of sparse
second-growth brush.
Still mostly housing
and industry to Holmesburg
Jct. Then still
more industry but
many patches of
young second growth
wood, ~~also~~ with
Liquidambar, oaks,
etc. in low spots.
Some Liriodendron-oak,
etc. on higher ground,
Platanus abundant
along streams and
ravines.
More open fields,
scattered trees, especially
along roads and near
houses. Cultivation
and Andropogon. Small
marshy spots surrounded
by trees.
Young second growth,
especially Liquidambar,
Sassafras, etc. before
Croydon Sta.
Mosaic of this, cultivated
fields, etc. between here and

Bristol and Tacony Bridge.
After Bristol some
marshes and open
fields of Andropogon.
After high level bridge
a mixture of fields,
young second growth,
thickets and housing
areas, some small
patches of trees.
Levittown - Tullytown Sta
Marshes and swamps,
some higher ground.
A good patch of Betula
nigra, some Typha, etc.
On slopes patches of
Sassafras saplings,
thickets and small
woods of Acer rubrum
very common. More
and more woods, but
mostly thin second
growth. Much Lonicera
japonica. Betula nigra
even on higher ground,
as ~~Torresdale~~ Morrisville
is approached
Large bottom land wood
~~[illegible]~~ with Liquidambar,
etc. along Delaware River,
but rather little.
Mostly built up.
~~[illegible]~~

Trenton
Outskirts are a large
industrial area
Some vacant ground
with Andropogon
and scattered trees,
mostly oaks
Then mosaic of
Andropogon and
patches of second-growth
woods around American
Standard plant. The
second growth spruce
and with second generation
3 m. tall. A large
Typha marsh, some
shrubby swampy
ground.
Then large open
cultivated fields
and fair sized patches
of deciduous wood.
Some Betula nigra
swamps.
More mature patches
of oak woods being
selectively logged.
Lower slopes with
alternation of Liquidambar
woods and Betula swamps.
~~Over~~ Betula here may
be B. populifolia on
higher slopes.
Princeton Jct.

Very irregular mixed deciduous woods, much logged out in past, but with some large trees, areas of swamp.
Then large open area with houses and industrial plants near Plainsboro.
Farms, Liquidambar-oak-Betula nigra woods, some red maple, some brushy swamp with patches of marsh. Liquidambar the most common tree. Tangles of Smilax. More and more farmland till Edison (Midway mostly open. Then more of the same mosaic but with little or no farmland. Betula populifolia and Sassafras, as well as Rhododendron common in higher spots. Some patches of Andropogon. Low wooded country to Johnson & Johnson plants. which are in large open area. Then very sparse old field woodlot

growth in Andropogon. Some housing
Then a mosaic of open fields and patches of woods, all deciduous. Industrial area before New Brunswick rather open, with some thickets.
After the tour an area of river-bottom wood, rather sparse. Then broken patches of thicket, deciduous woods, housing, fields, factories, etc. to Edison.
Then a large area of low deciduous woods, Liquidambar, oaks, acer rubrum. This gives way to sparsely-grown up old field and patches of Andropogon. Then farms and patches of housing in Metuchen (?) Then Liquidambar-acer rubrum woods, rather young and irregular.
Menlo Park Sta.
Patches of housing & woods
Iselin Sta.
Housing scattered in woods. Some Andropogon

and a golf course.
Soil in this region is deep brown to red.
Housing more and more replaces wood to Rahway, which has many trees, mostly native ones as far as can be seen. Considerable industry with housing and some deciduous second-growth wood Linden Sta.
Thickly populated but still many trees. Housing becomes denser and trees less into Elizabeth. But Elizabeth generally has fair number of trees - oaks, London plane, maple, etc.
Industry increases rapidly, as does general density, into Newark little except residential patches here, occasional Ailanthus.
Leaving Newark a dense industrial area gives way abruptly to Phragmites communis marshes in places being filled in with city waste.

Large areas of Phragmites extend to the first basalt intrusion just beyond a large tidal river in the outskirts of Jersey City.
The basalt hill is covered by andropogon and a sparse growth of stunted oaks.
Then more Phragmites between here and the entrance to the tunnel.
The Phragmites is dense, canes a few cm. apart, 1-2 m. tall. Partly with old inflorescences.

1956 Virginia

Dec. 22 - between Herndon and Sunset Hills
low swampy open woods, mostly oak and red maple

38663 Lycopodium obscurum
abundant

1 64 Lycopodium ~~dendroideum~~ complanatum L.
common (but more so on slightly higher ground)

11 m(ast)

rhizomes buried, shoots erect, leaves somewhat compressed into subdistichous arrangement
extensively creeping, rhizome buried in loose litter.

1956 Maryland

Dec. 26 - Trip by rail from Washington toward New York, Pennsylvania R.R., right side windows of train

Waste spots along track, with dry grass, especially Andropogon virginicus. Patches of trees, especially clumps of Ailanthus, some oaks, red maple.

National Arboretum with low hills covered by deciduous woods in distance. Beyond this broken woods, grass and marsh, swamp forest in Anacostia River bottom land.

Liquidambar, oaks, elm(?) and red maple with Pinus, mostly P. virginiana scattered and locally in patches - low spots with standing water back pines.

A few old fields on rolling ground going up to brush, mostly Pinus virginiana.

Banks along trail largely covered by Lonicera japonica - dull purplish green.

Pines become more and more abundant, in places dominating landscape. Banks here mostly covered by pine seedlings and saplings.

A few farms and housing development, but country along track mostly wooded.

Bowie -

Deciduous woods more and more common, pines scattered except where concentrated in old fields.

Betula nigra, with pinkish trunks, especially in low spots.

Soil very sandy.

Liriodendron common in most sites except lowest. Fagus gepsions but very local.

Pines become very abundant in broken landscape of well grown old fields. Mostly P. virginiana but considerable P. rigida.

Country very flat.

Locally many small ponds.

Then open gently
rolling land with
andropogon, scattered
small oaks and pines,
locally gregarious
and forming thickets.
Large factory a little
distance from track.
Then brushy swamps
and rolling thinly
wooded land, some
areas of small deciduous
woods, scattered pines.
Ponds and low woods
across from Calvert distillery.
Houses abundant but
with many trees.
Some badly cut up
excavated ground with
patches of wood.
High banks - then
a general electric plant
and other factories
and much housing.
Some small patches
of deciduous woods
also ~~dump~~ dumps. Housing
merges into city of
Baltimore.

Jan. 1 south of Centerville east of Bull Run

cutover second-growth deciduous woods with scattered patches of small pine.

Flat to gently rolling

round trees to 20 cm. dbh

c Quercus velutina
c Carya spp.
c Quercus alba.
la c Cornus florida
o Viburnum sp.
o Vitis sp.
o Ilex opaca grandifolia (very small)
lc a Juniperus virginiana
~ Cercis canadensis
lc ~ Fraxinus americana
~ Prunus americana
la Pinus virginiana
lc Rhus copallina
~ Acer rubrum
Quercus stellata
l Prunus serotina
v.l. Liriodendron

Density of large trees varies from rather open to very open. ~~Sapling~~ Sapling layer dense to open. Pinus virginiana saplings quite common locally abundant.

saplings mostly oak, cornus, a few of each & most of other species listed.

Generally but not always the more open the situation the commoner the pine saplings. They are conspicuous all along the road. Some patches of Lonicera japonica especially along road, but not very common.

~~Large~~ Maximum size of trees increases toward Bull Run, some may exceed 30 cm. near the escarpment, though not many reach such a size.

Stumps of various ages are common in the woods, but none very recent. Obviously logging has, in the past, been rather severe.

Several exposures of "trap rock" here.

Jan. 1 north of Occoquan
Creek, w. of mouth of Sandy Run
s.e. of Farrs Corner
301-71

Thick wood of Liriodendron, oak etc. on dissected ground. Trees mostly 25 cm. or less. Some pine, locally abundant
Patches of Kalmia in general
underneath small patches of Spiraea
Young Fagus very common but no old trees seen on beginning of ridge.
One Tsuga tree 15+cm dbh on knoll in area of concentration of pines. Scattered small Ilex opaca. Some Acer rubrum.

Stumps seen but all very old.

In a distance beech become locally abundant Here scattered small hemlock.

Above ~~Occoquan~~ Cr. a large patch of Rhododendron maximum up to 3 m. tall

This forest is suggestive of a more favorable habitat than that in the Bull Run area. The soil here is either coastal plain alluvium or deeply weathered schist. Some quartz fragments seen. Depth, as indicated by erosion pattern, is much greater.

A road runs in, following a sinuous ridge. This has been newly bull-dozed, but may be an old road.

1957 Virginia

north side

Jan. 1 – Occoquan Creek above Ryan Dam, west of Stillwell Cr. in mixed woods at top of escarpment overlooking Creek

38669 Tsuga canadensis
common, mostly small trees.

66 Rhododendron maximum
small colony

Jan. 13 – 7 mi. n. of Bull Run

Second growth deciduous forest with scattered junipers and a few small pines.

Trees mostly sapling and pole size, a few 20 cm. d.b.h. and a very few old wolf trees 30-50 cm.

Much of this is open enough for pine seedling

Probably was pastured rather heavily, possibly for some time after the forest started to come back.

Mozaic of patches of varying ages, possibly reflecting fire history as well as that of land use.

Small openings in woods. Patches of moss and lichens may be result of small ground fires.

60 m.

small tree, 9 m. tall

shrub 3 m. tall

a few patches of pine, also patches of rather good forest. Juniperus varies a good bit in abundance.

Deciduous trees are mostly oaks of various kinds.

Prunus serotina. Carya spp.

Most of largest trees are Quercus alba.

Some small Q. cinerea.

Wolf trees common in parts, absent elsewhere

No Taxus seen.

1957 Virginia - Maryland

Feb. 10 - north-west of Great Falls, Fairfax Co. 50 m.

38607 Dryopteris austriaca — fronds green, mostly almost prostrate.
2 in thick woods, mostly Rhododendron

March 9 - Benedict, Charles Co. Patuxent River Estuary 1 m.

1 68 Phragmites communis L. — canes 1.5 m. tall.
dense stand in marsh

March 9 - Battle Creek Cypress Swamp, Calvert Co. M.F.

1 69 Taxodium distichum — 2 m. tree 15 m. tall, leafless at this season, clusters of
dominant tree in swamp forest — buds pendent

1 70 Campsis radicans — woody vine climbing in bushes, leafless at this season.
common in edges of swamp

1957 Virginia

March 10 - area below Great Falls.

Elms and red maples in bloom.

This area marked "meadow" on a map of the William Fairfax plat in 1739 (Aug. 11 by John Warner filed at Richmond. The record of this survey, by, Jr. Warner, lists numerous witness trees. In order of abundance: (dates Aug. 17, 1739) (Jack Dalton has copy)

White oaks
red oaks
black oak
Spanish oak
Water oak
Live oak
Water live oak
Chestnut oak
Chestnut
Birch

There are at least two elms in bloom - the one with very corky bark and one with more platy bark, probably Ulmus americana None smaller than 15' bear any flowers, scarcely any smaller than 25-30'.

36871 Ulmus
common on rocky flat

50 m. Plants seen in identifiable condition:
Dryopteris marginalis
Asplenium trichomanes
Asplenium platyneuron
Polypodium vulgare
Botrychium dissectum
Selaginella rupestris
Pinus virginiana
Juniperus virginiana
Hepatica americana (ff.)
Claytonia virginica (ff)
Celtis occidentalis
Platanus occidentalis
Acer rubrum
Acer negundo
Lindera benzoin
Lonicera japonica
Ludwigia alternifolia
Saxifraga virginica

tree 20 m. tall (fallen twig) bark corky-ridged.

1957 Virginia

March 17 – Potomac River just below great falls
Wooded river flats

3&7-72 Ulmus thomasii?
4 common in deciduous woods

Plants seen in flower in flats –
Ulmus thomasii
Ulmus americana
Claytonia virginica
Cardamine laciniata
Veronica
Arabis
Lindera benzoin (bud)
Acer rubrum
Asimina triloba (bud)
Vinca minor

2 73 Asimina triloba
occasional, local
1 74 Arabis hirsuta
common along paths
1 75 Veronica
abundant on banks and along paths

50 m.

small tree, bark with corky ridges (There saw much larger, to 20 m. tall and 4 dm. dbh.)

shrub 3-4 m. tall, buds dark brown
flowers white

flowers lavender.

1957 Virginia

April 13 below Great Falls

Claytonia very abundantly flowering. also in flower

Mitella
Dentaria laciniata
Dicentra cucullaria
Arabis laevigata
Arabis hirsuta
Lindera benzoin
Barbarea vulgaris
Lamium amplexicaule
Veronica sp.
Phlox divaricata
Glechoma hederacea
Ranunculus abortivus
Cardamine (large fl.)
Stellaria media
Viola papilionacea
Mertensia virginica
Vinca minor
Stellaria pubera
Saxifraga virginica
Hedyotis caerulea
Hepatica virginica
Corydalis aurea
Euphorbia peplus
Asarum Shuttleworthii
Podophyllum peltatum
Dentaria diphylla
Erythronium americanum
Phlox subulata
Quadria heterophylla

38676 Ulmus
common on flood plain

Taraxacum vulgare
Alliaria
Trillium sessile
Cercis canadensis
Cornus canadensis (bunch berry)
Viola (grapish leaf)
Lagina serpyllifolia
Draba verna

50 m. (same tree as 38671, 38672)

1957 Louisiana
Estelle and Jane

April 3 Fort Macomb
Chef Menteur

Extensive marshes dominated by Phragmites communis locally by Baccharis and Iva but these badly affected by drainage ditching.

Last year Phragmites culms 3-4 m. tall, dry, fruiting, bare or covered by sheaths from which blades have fallen, young leafy culms to 1 m. tall.

Salinity of marsh water said to be 6-7% of sea water.

Best references -- Penfound, W. & Hathaway, E.S., Plant Communities in the marshlands of Southeastern Louisiana, Ecol. Monogr. 8:1-56, 1938 and O'neill, T., The muskrat in the Louisiana coastal marshes. La. Dept. Fisheries, 1949.

39677 (A) Phragmites communis dominant in marsh

A common vegetation type in these marshes, but not seen in good development is termed locally "chenier" an area slightly higher than the marsh, covered by small oaks, mainly

artificial higher ground around ruins of fort covered by thicket of Celtis mississippiensis with some Gleditschia, Juniperus, Zanthoxylum, and dense undergrowth of Ilex vomitoria and Melia azederach, both flowering. Trees have abundant Tillandsia usneoides. Lonicera japonica occasional, flowering. In moat of fort are floating mats of Alternanthera philoxeroides (introd. from Tropical America, reproduces vegetatively only). Around thickets is limited bona-nox, abundant Allium triquetrum producing flowers and bulblets, Scutellaria and other herbs.

Old canes 3-4 m. tall, bare, new ones to 1 m., leafy.

Quercus virginiana, with other woody species. Slightly higher ground, still is likely to have larger oaks and pines but is not called "chenier".

1957 Louisiana

April 3 - 1-2 mi. east of Ripoletteaux Bridge.
Low wet but solid ground, with abundant herbaceous flora and widely spaced Pinus taeda, Quercus virginiana, Q. stellata, etc. hung with Tillandsia usneoides.

38678 Hedyotis caerulea var. minor rare along very slightly higher ground near pines.

April 3 - same but to east and toward Pearl River
Denser pine-oak woods on flat ground, with Pinus taeda, Quercus virginiana, Q. stellata.

April 3 - 7 mi. e. of Slidell, n of Pearl River.
Swamp, dominated by Nyssa biflora, with some Quercus nigra, Acer rubrum var. drummondii and a little Magnolia virginiana in standing water. On the edges, on wet silty soil, as Liquidambar, Quercus phellos, Quercus virginiana,

St. Tammany Parish

The open character here seems to be due to fire. Common genera here - Panicum, Fimbristylis, Juncus, Tradescantia, Krigia, Baptisia, Nothoscordum, Scutellaria, Hedyotis, Plantago, Eriophorum, etc.

flowers lavender with reddish centers.

Q. nigra, Q. falcata, Liquidambar, Nyssa biflora; shrubs, as Ilex vomitoria, Myrica cerifera, Ilex opaca, Symplocos, some Smilax.
The oaks have much more Tillandsia than do the pines.

Myrica cerifera, Crataegus sp., as well as the trees seen to the west (above). This forest is scarcely definitely layered. Polypodium polypodioides and Tillandsia are epiphytes: Smilax laurifolia and S. bona-nox are not abundant. The large trees have been cut, leaving stumps.

The swamp trees, especially Nyssa, have swollen bases. Very little Taxodium seen. Spacing of trees in swamp 1-3 m. General height is about 25 m.

Mixed swamp and slightly higher ground

38679 Acer rubrum var. drummondii common in

80 Drosera brevifolia Pursh ? common on open wet soil

81 Hedyotis caerulea var. minor very rare on wet soil.

82 Lymnocarpus tinctoria (L.) Hitchc. rare on moist slightly higher ground in woods.

83 Kuhnia common on wet ground

84 Hedyotis uniflora (L.) rare on open wet ground

85 Elatine americana (Pursh) Am. ? common on open wet ground

86 Lisyanthus brownii small occasional in open wet ground.

87 Centella repanda occasional in open wet ground.

St. Tammany Par.

some open ground, disturbed, with herba pioneers, in moist sandy-silty soil.

small trees 3-4 m. tall (others seen taller); all seen have pubescent leaves, plant reddish; corolla white.

slender tree 5 m. tall; flowers cream; old leaves reddish.

flowers yellowish

depressed.

flowers yellow marked with black inside, segments carinate, ~~base~~ ~~undulate~~ base of flower maculate.

rhizome prostrate, creeping, buried; leaves erect with blades vertical; stems.

1957 Louisiana

St. Tammany Parish

April 3 - Indian Village, Pearl River, 10 mi. east of Slidell

Swamp with Nyssa biflora, Nyssa aquatica, Quercus nigra and Taxodium, heavily covered by Tillandsia

39698 Polypodium polypodioides abundant on trunks and limbs of giant live oaks.

Iris abundant in open spots. Polypodium polypodioides abundant on trees or higher ground.

rhizome creeping, clinging tightly to bark.

April 3 - Slidell

Open pine-land on clay soil with Andropogon, etc.

89 Lamarckia aegilopoides Macf. occasional in

petals pendent, lemon yellow.

April 3 - Pearl River Village, on branch of Pearl River.

Swamp of Nyssa biflora, etc. mixed with higher ground with Pine-oak-beech forest and thickets on clay soil.

Quercus nigra Q. virginiana, Q. alba (southern limit), Acer rubrum var. drummondii, Fagus grandifolia, Pinus taeda, P. glabra. Myrica cerifera is very common.

90 Illicium floridanum Ellis local in low ground, ~~edge~~ edge of swamp

— shrub with strong odor, flowers deep red.

91 Asarum common locally on low ground.

flowers urceolate, fleshy, greenish pink.

92 Vaccinium rare on slope

— shrub 1 m. tall, flowers white, pendent, leaves glaucous beneath.

38693 Fagus grandifolia
common locally on slopes ~~and~~ to above swamp level

94 Pinus glabra
common on slopes and flat ground above swamp level.

95 Illicium floridanum Ellis
local on low ground near swamp

April 3 near Slidell, east of Covington
"acid bogs" open flat land covered by Andropogon, sandy clay soil; surface layers somewhat darkened.

April 7 - Edge of Lake Pontchartrain s.w. of Slidell, end of causeway. Narrow strip of marsh between lake and pine-oak forest. Between road and railroad is extensive marsh.

96 Amorpha fruticosa
common at edge of marsh or dry ground.

Apr. 7 - Lake Pontchartrain, n.e. of Gentilly, New Orleans
Remains of cypress swamp, trees all dead. Said to have been

tree 10 m. tall, 20 cm. dbh. leaves young.

slender
small tree (others seen to 30 m. tall) ~~slender~~; leaves irregularly spreading; (ones from fallen branch of another tree)
sterile shrub 1 m. tall, tough, strong smelling when broken.

said to quake. Ilex prunifolia is common, young pines scattered, some Sphagnum along rivulets.

very slight difference in altitude between marsh and forest, but transition quite abrupt.

shrub 2 m. tall; corolla deep purple, anthers orange.

killed by rise of pH due to salt water blown in by hurricane many years ago from Lake Borgne. Never has recovered.

1957 Virginia

May 5 - ~~rabba~~ south of Springfield

rather sparse pine woods mostly Pinus virginiana a few P. rigida.
1-3 dm. dbh, about 20 m. tall, spaced mostly 2-4 m.
a few Liriodendron about same size, a scattering of Nyssa, Liriodendron, Acer rubrum, etc from 5-10 m. tall, a rather abundant but scattered shrub layer mostly 1-2 m. of tree seedlings, Sassafras, Acer rubrum, Fagus, Liquidambar, ~~Quercus~~ Quercus phellos, Vaccinium atrococcum, Quercus alba.

a more abundant but still scattered low shrub layer 3-10 dm. of Vaccinium vacillans, V. stamineum, Quercus phellos, Q. alba, Fagus, Acer rubrum, Smilax hispida, Q. glauca, Kalmia

ground layer still scattered. China Hill.

graculata, Mitchella, Pc
Rhus toxicodendron, a
Cypripedium acaule Dc
Asarum hypenuefolia (k)
Potentilla simplex (o)

Polystichum acrostichoides (k)

38697 Vaccinium vacillans
" very common in
" 98 Vaccinium vacillans ?
one plant seen

" 99 Vaccinium atrococcum
one plant seen
1 38708 Hedyotis caerulea var. caerulea
very local in
2 01 Isotria verticillata
very local in

4 02 Cypripedium acaule
very common locally in

1 03 Viola primulaefolia
local in moist depression in

May 5 - 1 sm. east of Annandale
2 04 Lonicera
in pasture fence-row

forming loose clones up to ca. 3-4 dm. tall; flowers reddish green
small bush 4-5 dm. tall, flowers reddish green.
shrub 1.5 m. tall.

flowers pale lavender, centers yellow.
lip white, 2 petals pale green, sepals dark brown purple.
lip rose purple, marked in front with white; petals and sepals dark brownish red.
flowers white.

shrub 1.5 m. tall; flowers white.

1957 Maryland

May 11 - air trip Washington to N.Y.

South of Washington - Baltimore Parkway in vicinity of Greenbelt are areas where the angular pattern of pine forest in a matrix of bright green broad-leaf forest shows up strikingly well. Outlines of old fields, roads, etc. are very clear. Some of the deciduous forest is variously mixed with pine.

For some distance south of Baltimore the landscape is incredibly butchered. Highways and real-estate "developments" dominate the scene, even obscuring agriculture. Military installations along the bay cover enormous areas, and tank farms are prominent and extensive.

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extensive crops & woods; where cultivated the soil is black.

May 11. air trip from New York to Montreal

First part of trip cloudy. The country west of the south end of Lake Champlain is flat or rolling agricultural land with scattered monadnock hills which are generally wooded, about 90% a more deciduous with patches of conifers.

North of this hills become more numerous and run together as a complex - higher and more mountainous but still predominantly in deciduous woods, some burned areas, some blue-berry barrens?, lakes. Conifers increase northward. Soil very pale buff-gray, some dark mottling but this inconspicuous.

North end of lake on a broad plain with no hills or only very low ones. Agricultural with patches of mostly pine mixed forest, soil here very black with some buff mottling. This extends north to Montreal, with

1957 Quebec

May 11 - Montreal

n ~~Mountain~~ Mount Royal
(a limestone monadnock)
Degraded beech-maple
forest - beech mull soil from
a Acer nigrum (Malaysia drugs limestone)
r ~~Fagus~~ Ulmus rubra?
o Tilia americana
o Ostrya
l Betula papyrifera
o Acer rubrum
o-c Tsuga canadensis
c Fraxinus americana
l Populus grandidentata
r Quercus rubra
o Amelanchier sp.
Corylus cornuta
a Prunus virginiana
a Cornus rotundifolia
c Smilacina racemosa
lc Caulophyllum thalict.
a Erythronium americanum
c Trillium grandiflorum
c Sedge flexicaul
c T. cuneatum
c Thalictrum dioicum
o Carex
l Diervilla lonicera
r Lonicera sp.
lo Maianthemum can.
l Polygonatum pubescens
r Actaea
l Rubus odoratus
lc Viola pennsylvanica

a very prominent
1-2 m. undergrowth
of Acer nigrum & Cornus
rotundifolia + Prunus virginiana.
This from a certain amount of
long continued disturbance and
r Populus deltoides [illegible] opening up.
r P. tremuloides*

l Sambucus racemosa
r Acer negundo
~~hypoplanchnon~~? * (Artemisia Tatarica)

* there around an overgrown
small opening, probably
a former house site.

l Aster cordifolius
r Trillium erectum
lr Hydrophyllum virginianum
l Celidonium*
r Lamium sp
r Aralia nudicaulis
r Circaea quadrisulcata

Large birch colony where
formerly cleared, much sem.
B. americana.

1957 Quebec

May 12 Oka

Beech maple forest, little altered.
Almost solid stand
of Acer nigrum s.
sens

o	Quercus rubra
o	Fraxinus americana
o	Tilia americana
r	Ulmus americana
lo lc	Fagus grandifolia
lo	Carya ovata
lo	Carya cordiformis
o	Ostrya
o lc	Sambucus racemosa
r	Prunus virginiana
r	Aralia nudicaulis
c	Amphicarpa bracteata
O	Apios tuberosa clayton
a	Thalictrum dioicum
a	Trillium grandiflorum
a	Uvularia grandiflora
o	Laminum deflexum
lc	Viola pennsylvanica
la	Smilacina racemosa
o	Sanguinaria can.
o	Solidago caesia
lc	Carlophyllum
o	Aralia racemosa
c	Polygonatum pubescens
O	Prenanthes racemosa
la	Erythronium americanum

Dark brown mull soil on precambrian Laurentian rocks but there silt overd. a rather thin shrub layer, mostly Acer seedlings.

lc	Botrychium virginianum
o	Carex sp.
r	Solidago flexicaulis
r	Dicentra canadensis
l	Allium tricoccum
	~~Poaceae~~
r	Carex arctata
r	Galium sp.
r	~~Epi~~ Arisaema atrorubens
r	Trillium erectum
	~~Purple~~

- fruit somewhat pyriform, stamens yellow

On north slope
some Tsuga, abundant in some
Acer pensylvanicum
Streptopus roseus
Adiantum
Ribes cynosbata
Trillium erectum
Asarum canadense
Viola canadensis
Rentaria diphylla
Hepatica acutiloba
Maianthemum can
Equisetum scirpoide
Carex pedunculata
Mitella diphylla
Thelypteris dicyanis
Polystichum acrost
Adiantum pubescens
Betula lutea
Pinus palustris
Actaea rubra

c
Trees species added to those in the forest or it is on other slopes. l

Patches of pine with
Pteridium, Vaccinium, gaultheria
Carex pensylvanica, Kalmia angustifolia
Antennaria sp.
Lycopodium tristachyum
Quercus sp
Gaylussacia baccata

On alluvial plain irregular
~~on~~ stands of Populus
Tremuloides, P. grandidentata
with scattered Pinus
strobus (~~P. resinosa~~). Acer
rubrum, Salix sp.
Quercus alba.

with Equisetum hyemale
Rhus typhina
Gaultheria procumbens
Trillium grandiflorum
Onoclea sensibilis
Hepatica americana
Vaccinium angustifolium
Cornus canadensis
Fragaria virginiana

Open sandy places
Comptonia peregrina
Carex spp

Quercus rubra has
some coccinea-like leaves.

Solidago remoralis
Pteridium aquilinum
Arctostaphylos uva-ursi
Danthonia spicata
Vaccinium vacillans
Amelanchier spp

Along lake margin
are sand flats with
low halix spp. dens stand (ca. 4 ft. alt.)
A low sand ridge
with oak forest - Quercus
alba, Q. rubra and hybrids
Acer rubra, Tilia americana
Ulmus crispa,
with ~~Fraxinus~~ nigra
Ulmus thomasi
Carex spp. Corylus cornuta!

back of this swampy
wood with Acer
saccharinum,
a little Fraxinus nigra
with Populus tremuloides
Osmunda cin.
Willows here in
disturbed places.

The Acer saccharinum
are dense clusters of
sprouts, appearing
to be from stumps, but
these considered by P. D. to
be natural, not from
cutting.

Higher spots have beech-
maple forest. Trillium etc.

June 1 – Great Falls of the Potomac 50 m.
Flood plain stream with large boulders and rock outcrops.

3	05	Osmorhiza claytoni (L.) Clarke common on sandy semi-shaded spots between rocks	erect, flowers greenish-white
2	06	Viburnum recognitum Fern. common in undergrowth	shrub 2 m. tall, flowers white (all seen were flowering)
1	07	Viburnum dentatum L. common in undergrowth	— shrub 2 m. tall, fruits immature (all seen had fruit this age).
1	08	Melica mutica Walt. occasional in semi-shade	—
1	09	Panicum occasional in semi-shade	almost erect
1	10	Panicum rare in semi-shade	erect
1	11	Danthonia spicata occasional in semi-shade	culms ascending
1	12	Stipa avenacea L. occasional in semi-shade	culms ascending, — spikelets drooping.
1	13	Panicum occasional in shade	culms nearly erect.
1	14	Polygala polygama Walt. occasional in semi-shade	stems erect, flowers — rose pink
1	15	Euphorbia commutata rare in shaded banks	flowers greenish-white. — capsule angled very strong.
1	16	Carex grayi var. hispidula Gray rare in damp shaded place	very loose small tufts, — perigynia beaks firm.
1	17	Arabis laevigata (Muhl.) Poir. common in semi-shade	slightly glaucous.
1	18	Fraxinus caroliniana Mill. ? in coarse woods.	slender tree 8 m. tall, sterile; leaves green beneath.

1957 Virginia

38719 Prunus?
rare in woods

3 20 Arenaria serpyllifolia L.
rare in semi shade

1 21 Valerianella
rare in rocky place in woods

1 22 Arabis lyrata L.
common in rocky semi-shaded to shaded places.

1 23 Panicum
common in semi-shaded places

3 24 Ulmus thomasi Sarg.?
common in woods

Gonolobus carolinianus
flowering abundantly
in semi-open places at
top of cliffs.
Chrysogonum in flower
Ilex verticillata in bud.
Liparis in flower, very rare.

May 25 - Sleepy Hollow
stony roadside

1 25 Stellaria graminea
local colony

Fairfax Co.

slender shrub 2.5 m. tall.

flowers white.

culms ascending.

small tree (same tree
as #38671, 38672, 38676

decumbent, rooting
at nodes; flowers white.

1957 Connecticut

June 16 - Hemlock Ridge, east side of Lake Candlewood, north of Danbury

Low ridge formed of steeply tilted beds of gneiss, showing some small quartz & pegmatite veins.

Crest of ridge open because of narrow powerline right-of-way. Slopes wooded. Woods apparently second-growth after pasturing? or fire?

Largest trees are very sparsely scattered Quercus rubra with Betula lenta next and probably tending to dominate, as they are rather abundant. Betula populifolia to 10 m. tall, being overtopped by the B. lenta and Quercus.

38726 spontaneous between stone of terrace

27 fagina spontaneous between stone of terrace

28 Corydalis sempervirens naturalizing itself from planted specimen, around compost pile.

Juniperus virginiana common in forest but clearly suppressed, except in a narrow clearing where the Juniperus is vigorous and much larger. Eventual dominance may probably be by Carya sp. [Fraxinus americana] as seedlings & sprouts and saplings are very common.

Tsuga is common on top of the ridge, but trees are small. Quercus alba to 80 cm. dbh, a small Q. coccinea, larger Q. velutina

Acer rubrum fairly common

flowers creamy or slightly greenish white.

1957 Connecticut

June 17 – vicinity of Dolbia Hill, east of Eightmile River, East Haddam

Large block of wooded land with almost no roads. Small areas are in pasture. Some areas are Quercus ilicifolia scrub with sumac. Mainly the uplands are covered by mixed oak forest. The ravines and lowlands along the river are largely in hemlocks. Here the undergrowth is largely young hemlocks.

This land has largely been cut over, some of it recently, some long ago. Said to be not burned over much.

Between the Dolbia Hill farm and Brunhams Brook is an area of brushy old field, with Betula populifolia, Vaccinium corymbosum,

38729 Gnodea sensibilis?
along trail in hemlock-beech woods, Brunhams Brook

100–950' alt. USGS Hamburg quadrangle

along Brunhams Brook the forest is a mixture of Tsuga and sugar maple with much Kalmia latifolia. Fagus, Betula lutea, a little Acer rubrum and Quercus rubra

1957 Virginia

June 27 - trip ~~by~~ auto from Falls Church to High Knob near Norton casual observations - albizia julibrissin is freely naturalized out to well beyond Fairfax. It is in full bloom both wild and cultivated, shows a color variation from a pale creamy pink to a deep old-rose. Cult. abundantly in cooler mts.

Along Thornton River road just inside Shenandoah Park gate may be a stand of Conghastrum nutans. Also near the top of the road, just below Thornton Gap may be single tree of Picea abies.

June 27 High Knob, just south of Norton, Wise Co. common in oak forest on gently sloping ground

38	30	Hedyotis purpurea var. purpurea
1	31	Luzula
1	32	Thelypteris noveboracensis dominant ground cover

June 27 High Knob, Wise Co. Virginia. in Clinch Valley and similar limestone regions pasture and frequently thickly beset by small Juniperus or by small Crataegus. Which is dominant apparently depends on seed source.

The Alleghany ridges and Clinch mountains are densely wooded.

High Knob has a well developed oak forest, with trees to 30 m. tall and up to 40 cm. dbh. In a very sparse understory (at the camp ground) is Amelanchier sp., Nyssa sylvatica, Fagus, Menziesia, Rhododendron. Considerable Acer rubrum. Conopholis americana, Monotropa uniflora.

small tufts, flowers very pale lavender.

small tufts.

June 23 - by auto from High Knob to

Along road from High Knob to Norton and out of Norton to southwest dead twigs hanging on trees, especially oaks, suggest that a brood of 17 year cicadas has hatched this year. Some also in Cumberland Gap area.

In the Powell River valley the slopes far up the sides of the mountains are pastured, but the upper slopes and ridges are wooded.

In Kentucky, between Middlesboro and Corbin the terrain is broken and wooded. Liriodendron is the most abundant tree, but seems mostly

June 24 - Cumberland National Forest directly west of London

37733 Coreopsis
1 common on soft sandstone and sand in full sun

1 34 Hedyotis:
common along road in sand

rather young. Mixed forest of tulip and pine (Pechinata and P. virginiana) and some oaks and other trees seem to be commonest here, but there are also many deciduous forests, largely tulip.

North of this is a rolling largely cultivated area, at least to London. West of London is a section of the Cumberland national forest lying on a flat bedded sandstone formation. This is also mixed, but pine is more common than anything else. Westward this is considerably dissected. The woods do not seem very old.

rays bright yellow

June 28 - Mammoth Cave discovered 1799
"Frozen Niagara" trip.

First descent is through vertically cut fluted tubes in a granular Mississippian limestone.

Water table 360 ft. below surface.

Moss around many of the lights, mostly just protonema, but one light has leafy plants with sporophytes.

Temperature 54°F.

From "Grand Central Station" to "Frozen Niagara" the cave is dry and there is no moss. At the Frozen Niagara area and to the entrance it is very moist. Here are algae, moss protonema, and up to high to see fa and a number of what appear to be fern prothalia.

Cave crickets are common on the ceilings in lighted fairly moist areas. They are fairly sluggish, hump-backed, and with extremely long antennae.

162 miles explored since 1799.

Park includes 51,000 acres of forest land.

This forest is quite varied, some being in various stages of regrowth from old fields & pasture. Stands of pure Juniperus virginiana occur. Around the picnic area is tall mixed forest of several oaks, hickories, beech, red maple, and Ulmus americana, etc. with a well developed under story of Cornus florida, Nyssa sylvatica, Ulmus alata, and what appears to be U. thomasii. Some of the oaks are at least 40 m. tall. Quercus falcata and Q. alba have the leaves with longer, narrower lobes ~~above~~ than on the upper branches than on the lower. Fagus is also somewhat dimorphic, with much smaller leaves on the upper branches than on the lower.

1957 Kentucky - Missouri

✓ June 28 - Mammoth Cave
Edmonson Co.
in deciduous woods on
flat ground

38735 Ulmus thomasii
occasional in understory

3 36 Quercus falcata
very common

3 37 Fagus grandifolia
very common

June 29 - from Mammoth
Cave, Ky. via ~~Hick~~ Columbus
Ky. and Hickman Ferry
to Elsinore, Mo.

Western Kentucky is
fairly flat. mostly
cultivated but with
patches of woods. No
hills of any size.

In the flood plain of
the Mississippi south
of Columbus, just
west of Oakton, is a
swamp with Taxodium
and Nyssa caroliniana (?)
2 large cypresses seen,
some smaller ones.

On west side of river
a small grove of cypress

7 25 m.

small tree 7 m. tall,
bark very corky.

tall tree, 30 m. tall,
these specimens from
upper branches, leaves
on lower branches broadly
cuneate, trilobed, lobes broad.

tree 25 m. tall, fruiting
twigs from upper branches,
sterile ones from lower.

seen east of St. Francis
River near Fisk.

Along Mississippi the
sand bars, except the
youngest, are covered
by a dense growth of
willows.

N.W. of Poplar Bluff
the Clark National Forest
is mixed Pinus echinata
and oaks.

Here we encountered a
terrific rainstorm.

✓ June 30 4 mi. west of Mansfield, central Ozarks. Wright Co.

38738 3 Galium
locally abundant in weedy pasture
erect but supported by other plants.

✓ June 30 1 mi. east of Seneca, Newton Co.

x 39 Festuca
dominant in level to sloping fields resembling tall grass prairie, possibly planted, obviously used for hay or pasture.
erect, panicle arching.

✓ June 30 - Osage Hills State Park, Oklahoma
very broad ravine, 2 miles ± more wide, with sparse scrub forest or woodland of Quercus stellata and scattered Carya sp.
The largest trees are 8-11 m. tall, with thick crooked trunks. Where the trees are widely spaced an understory of Q. stellata saplings is prominent. Thick ground layer of grass and herbs.

1 40 Sedum
rare in open ~~to~~ rocky bed of ephemeral stream in oak woodland

1 41 (cont.)
very common in open rocky bed of ephemeral stream in oak woodland
rays white, disk yellow.

1 42 Sabbatia
common in open rocky bed of ephemeral stream in oak woodland
flowers bright rose pink.

1957 Missouri - Oklahoma

June 30 - Trip from Elsinore, Mo to Osage Hills, Okla.

West of Elsinore the woods become almost entirely deciduous, mostly oaks. The rolling somewhat hilly, generally wooded country continues to 3 miles to so southwest of Springfield. After that the ground becomes more level and mostly cultivated.

Just east of Seneca bits of prairie begin to appear. One piece looks much like tall grass prairie but may be planted (photos), seems to be largely a species of Festuca, but on lower ground is an almost pure stand of Agropyron sp.

In Oklahoma extensive prairies appear and woods are principally on slopes and in broad ravines. This pattern is more pronounced westward. The forest is a sandy woodland mostly of oak. Some areas of this are dead or almost so. Fire? Disease?

Between and Bartlesville about 25 box tortoises were seen crossing the road or dead ~~killed~~ on the road. Few either east or west of here.

Inside the road leading from the highway to the Osage Hills State Park 5 trapdoor spiders were seen crossing road. When molested no of them reacted violently, jumping and elevating the abdomen and extending two caudal appendages. It retreated only with some reluctance. These spiders were seen on road both in the evening at about 7 pm. and in the morning at 8:30 am.

During the night there was a violent thunderstorm, with gusty wind. Before it the weather was extremely sultry and hot. Drizzle continued till about 7:30 a.m.

June 21 Trip from Osage Hills S.P. to Buffalo

Westward the amount of forest decreases and is more strictly confined to ravine bottoms and stream margins and is less composed of oak and more of cottonwood and other trees. An exception is a considerable patch of well developed oak wood or flat ground some miles east of ~~Ponca City~~ Tonkawa

West of ~~Tonkawa~~ Lamont Cucurbita foetida, rel aff. suddenly becomes common along the roadside.

Bet. Lamont and Pond Creek is a considerable stand of Chilopsis linearis var. saligna along a row of trees, but may have been planted. Considerable variation in flower color. Argemone alba common along road. Some artemisias in flower with east of Buffalo.

At Buffalo the roadside park is a tiny bit of prairie that seems rather undisturbed compared with the part across the fence that is grazed

The grazed area is mostly dominated by Helianthus annuus with considerable Euthamia sp., Chenopodium aff. album (3 ft), a fine mat of grass, apparently mostly Cynodon, with many other herbs: e.g.

a Argemone alba
vc Amaranthus graecizans
c Sphaeralcea aff pedata?
c Linum (?) sp.
o Bromus japonicus?
c Helianthus bigelovii
c legume
c Monarda sp.
c Gaillardia picta
r-c Rudbeckia sp.
r Aplopappus
c Tribulus terrestris
o Cirsium sp
o-c Ambrosia artemisiifolia
l-c Kochia?
r Mirabilis
r Hordeum sp.
l Opuntia phaeacantha
l-r Commandra sp.?
r Euphorbia sp.
r Yucca sp.
l-c Plantago spinulosa
o Croton sp.
o Lepidium virginicum + c. Boutelloua aff. gracilis
r Gaura sp + bifera antirrhina

separated from this by a fence is a patch of low ground completely dominated by a mixture of Helianthus and Chenopodium. grazed also.

Across the fence in the park there are scattered trees, otherwise wheat not badly trampled, a medium grassland of Bouteloua sp. Sporobolus - Bromus ~~japonicus~~ vel aff. also with:

c Bromus tectorum
c la Kochia sp.
r Solanum elaeagnifolium
r Asclepias aff syriaca
c la Agropyron
c Panicum sp.
c Amaranthus graecizans
o Salsola kali v. tenuifolia
lc Hordeum sp.
r Gaillardia picta
o Chenopodium spp.
r Sporobolus asper ?
lo Euphorbia
o Mirabilis
la grass
r Arabis ?
o Evolvulus
r Sphaeralcea

July 1 – Trip from Buffalo, Okla to Capulin Mt. New Mexico.

Mainly grain fields, some ranges ~~along~~ from Buffalo to Boise City. Most of the ranges badly overgrazed, and some even dominated by Artemisia and yucca. Grain partly harvested and some plowing done. apparently a maize crop being put in.

West of Boise City the land becomes sandy and somewhat irregular, with patches of blow sand with yucca. Most of this is range, grass looking now, but the yucca and artemisia show past overstocking.

Eastern New Mexico to Clayton is almost all range. Zinnia grandiflora common along road.

From Buffalo to New Mexico Helianthus annuus is abundant along the roads and even in some fields.

Bet. Buffalo and west of Forgan an area covered by a strange low fog, thinning on high spots. ground very wet, air cold.

1957, Oklahoma

✓ July 31 - 1 mi. e. of Jct

38743 Chilopsis linearis
2 along road, probably planted as wind-break

shrub 3 m. tall, corolla orchid with 2 yellow ridges in throat, maroon patche on limb.

✓ July 31 Buffalo
in grazed prairie

1 44 leg.
common

2 45 Rudbeckia
occasional

2 46 Monarda
common

1 47 Plantago purshii?
common

1 48
local

1 49 Sphaeralcea
occasional

1 50 Gaura
rare

2 51 Linum?
occasional

1 52 Silene antirrhina
rare

same - in ungraged (mowed?) prairie

1 53 Bromus japonicus
common

1 54 Euphorbia
very common in disturbed spo

flowers deep purple.

rays yellow, disk brow
bracts mauve distally,
corollas orchid.

1957 Oklahoma

38755 ~~Bromus~~ Hordeum

1 common

2 56 Agropyron
common to abundant

1 57 Sporobolus
abundant

1 58 Bouteloua
abundant

1 59 Evolvulus
occasional

1 60
locally abundant,
forming patches

1 61 Mirabilis
occasional

2 62 Gaillardia
common

1 63 Gaura
~~rare~~ common

flowers pale, closing in evening.

ascending, many leaves.

rays deep red, yellow tipped, disk dark brown petals cream white.

1957 New Mexico

July 2 Capulin Mt.

top 7900 – 8245 feet
ash slopes covered by pinyon-juniper with Fuerus gambelii, Cercocarpus, etc.
Some grass inside crater, some oak scrub, higher slopes pinyon-juniper.
Opuntia erinacea? with yellow flowers common.
Echinocereus sp. rare
Many borages, penstemons, etc. Oenotheras, etc. in flower.

Vast broad grassy valley and high plains used for stock grazing. ~~Mountain~~ Slopes of small hills and mountains present a somewhat drier aspect than the plains.
The Cimarron Canyon is

shrub 3 m. tall
large pendulous

38745a Juniperus monosperma common on steep rocky slope

✓ July 3 Capulin Camp Ground, canyon above Taos
38764 Woodsia?
in Pseudotsuga-Abies forest
65 ~~Fallugia~~? Cowania stansburiana
abundant in open scrub on south facing slope.
66 Mirabilis
common in openings in scrub on s.f. sl.
67 Populus
dominant in canyon bottom

well wooded with Pinus ponderosa, Pseudotsuga, etc. some very large. Some spectacular cliffs above. At the head ~~The canyon above Taos~~ is similar
Of this is a dammed stream, forming Eagles Nest Lake. Then a broad grassy valley.
Going down the canyon above Taos is similar but one side heavily forested the other less so and with much pinyon-juniper and scrub of Chrysothamnus detenima and Fallugia?.
The forest on the south side is Pseudotsuga, Abies, lower down a magnificent solid pinyon forest. In canyon bottom at upper alt. Populus tremuloides, lower P. Trichocarpa

shrub
erect, somewhat glaucous, flowers beautiful rose pink, stamens 4.
tree 20 m. tall 80 cm. ~~thick~~ d.b.h.
catkins on ground.

1957 New Mexico

July 7 - trip from Taos to Painted Desert

Below Taos the Rio Grande is in a deep gorge. The mesas have sage while the slopes are covered by pinyon-juniper. A scattering of pinyons and junipers run down into the sage.

A few miles down the valley the terraces on the east side are dissected and covered by pinyon-juniper. Below this the sage disappears and is replaced by chrysothamnus. Some areas are fairly desert-like. Above Santa Fe is a large area of juniper that seems to be affected by a disease. A large proportion of the bushes are yellow, apparently dying, a few dead.

West of Albuquerque, especially in the neighborhood of Grants, the same thing was seen.

The plains west of Albuquerque, into Arizona have become dominated by Salsola kali v. tenuifolia

to the point where they appear to be grassland rather than desert, but most of the green is Salsola.

Throughout this area there is some juniper and in places some pinyon. From above Santa Fe to at least Grants a rose flowered Cylindropuntia, possibly O. versicolor is in flower. On higher spots the pinyon-juniper is fairly well developed.

In the Painted Desert the lava cap-rock is eroded away, exposing a many-colored clay-like a semi-consolidated clay, which erodes into rounded hills with dendritic ravines. The clay slopes and ridges have either no vegetation or a sparse low grass that, sterile, looks like Danthonia spicata. The ravines have a dense vegetation of Hordeum jubatum and a few dwarf bushes - atriplex, etc.

1937 Arizona

July 4 - trip from Painted Desert to Grand Canyon, n. rim.

Some good desert grassland inside Petrified Forest National Monument, badly overgrazed outside.

Enormous quantities of short lengths of agatized wood on surface, alone in place in "Painted Desert" clay, distribution quite uneven.

Along Little Colorado River Tamarix has become dominant woody vegetation. The halophytic vegetation mentioned yesterday apparently forms a belt along main highway, is not present ~~at~~ in any significant amount along highway in park. Many of common plants - Gutierrezia, Solanum, Zinnia, etc. much more luxuriant along road shoulder than away from road.

July 4 - just outside Petrified Forest National Monument on Holbrook

38768 Corrandra pallida roadside with atriplex and other shrubs.

Between Winslow and Flagstaff the highway climbs into a relatively luxuriant mixture of pinyon, juniper, and Pinus ponderosa on a rolling mesa. Here and there are cleared low spots under cultivation, evidently since prehistoric times.

Walnut Canyon is a spectacular gorge cut into this limestone plateau down into the sandstone which underlies it unconformably. On the ledges of the limestone cliffs are numerous tiny cliff dwellings. The south-facing walls have a ~~sp~~ sparse ~~shrubby~~ shrubby vegetation of Cercocarpus, Berberis, Quercus gambelii, pinyon, juniper, etc. The north facing slopes have Pseudotsuga and associated northern species.

very glaucous.

1957 Arizona

northward from Flagstaff the pine forest becomes an open parkland or pine savanna with grass and widely spaced large well formed Pinus ponderosa, forming part of the Coconino National Forest. Pinyons are scattered through this. Over the rise east of San Francisco Mt. this woodland extends through a region of old cinder cones, the finest of which is Sunset crater, with a well formed crater still visible.

Descending from this the vegetation changes to a juniper woodland with a few pinyons. This gives way to desert grassland and that in places to painted desert, the slopes in which are bare clay.

Around the canyon of the Little Colorado the flat ground has thin grass, the slopes rounded bushes of

Krameria?. The mountain slopes have pinyon-juniper.

The canyon of the Little Colorado is in its way as impressive as the Grand Canyon itself. It is a terrific vertical walled meandering chasm with ~~to~~ branching side branches equally deep. The walls are fluted and pillared with towers and buttresses standing out from the sides. The upper third is of horizontally bedded rocks, at least the top layer of limestone. The bottom two thirds are apparently granite. At present there are only a few puddles of water in the bottom.

The south rim of Grand Canyon is flat and wooded with pinyon + juniper ~~and Pinus ponderosa~~, with sage brush at Desert View. At higher levels the sage disappears and an open forest of Pinus ponderosa with some pinyon, ~~and~~ juniper and oak.

1957 Arizona

July 5 - trip from Grand Canyon to Zion Canyon

Pinus ponderosa at highest altitudes on the rim. Then pinyon-juniper-oak-sage, then sage, then, below 6000' an almost pure stand of Krameria (coll. just west of Dead Indian Wash on ~~x~~ slopes s. of Little Colo. R.) (photos of the gap, n. end of Echo Cliffs.)

Washes have Tamarix and various shrubs.

At ~~6000~~ Cedar Ridge are fields dominated by Opuntia of 2 or 3 species, one Cylindropuntia with green flowers.

The red Echo cliffs have almost no vegetation except scattered bushes on the talus below.

Before Marble Canyon bridge around a roadside basin are Gleditschia, cottonwood, Lombardy poplar, Eleagnus angustifolia and elm (Siberian?). Gleditschias are watered.

From Marble Canyon a gradual climb up a wash from desert up through desert grassland, heavily grazed, into pinyon-juniper, and at 6800' Pinus ponderosa begins. On the Kaibab Plateau is pure forest of P. ponderosa, with little undergrowth, vigorous regeneration where not too thick.

Descent from here to pinyon-juniper, then desert grassland north to Kanab Utah.

Above Kanab on way to Carmel is a very interesting sand area, with what appears to be a local Helianthus, extremely caespitose, almost a cushion-former.

Above Carmel Jct. toward Zion are conifers and cultivated fields. The upper parts of this road into Zion are through a curiously jointed white sandstone - Navajo formation. Below this

is red Chinle sandstone into which most of the canyon is cut. It is massive and not much jointed.

In the bottom of the canyon Acer negundo is the most important tree, but with cottonwoods.

Up the canyon toward the Abajos is a loose irregular woody vegetation of Acer negundo, Populus sp., Fraxinus sp., Acer nigrum var. grandidentatum Celtis occidentalis var. reticulatum, Quercus gambelii, etc.

Vitis sp. is common.

The cottonwood trees are as much as 20 m. tall, the box elder almost as tall, the ash fairly tall, the others small, up to 5 m.

July 6 - St. George

Low hills east of town are of red sandstone with sandy benches mostly of very thin soil on flat beds of sandstone.

Vegetation is a mixed desert scrub Larrea - Franseria but with Ephedra nevadensis, Krameria, Lycium, Ineolia, Opuntia, Dalea, etc. in some abundance.

Atriplex, Eurotia

Triodens, Aristida, Hilaria, Bromus?, and several broad leafed herbs common.

Lower slopes, below lowest ledges are very alkaline, with a white crust. Obviously seepy at times. Here Anemopsis, Pluchea, Atriplex, Baccharis, Juncus, and several herbs, Juncus effusus, etc. are common. ~~Also~~ A number of weedy plants, Lactuca, Salsola, etc. are common.

Just now this entire slope is very dry and powdery.

1957 Arizona — Utah

✓ July 5 slopes south of Little Colorado River, just west of Dead Indian Wash — 6000'

387 69 Krameria
2 dominant shrub over large areas of rocky slopes — rounded shrub 0.5 m. tall, grayish, rigid.

2 70 Fallugia paradoxa
in small ravine on dry slope — shrub 1.5 m. tall, flowers white, mostly faded.

July 5 – Zion Canyon below Narrows

1 71 Acer nigrum var. grandidentatum
very common on talus at base of cliffs — small shrubby tree, 4 m. tall, sterile.

1 72 Acer negundo L.
very common in canyon bottom — tree 5 m. tall (others much taller), racemes pendent.

July 6 – St. George

alluvial hills east of town — 860 m.

1 73 Psathyrotes
on bare ground in full sun — flowers yellow, odor very strong, sage-like.

1 74 Eriogonum
common on bare ground in full sun — flowers white.

hills of red sandstone and fine sand

2 75 Tridens pulchellus
common on ledges and thin sandy soil — tufted

2 76 Larrea divaricata Cav.
common generally — shrub 1 m. tall, with strong oily odor; flowers yellow.

1 77 Hilaria
common on sandy places — loose bunches

1 78 Mentzelia
occasional on sandy soil — flowers yellow

38779 Eriogonum
locally in sandy soil

1 80 Baileya multiradiata
occasional in sandy soil

1 81 Allionia incarnata
occasional, mostly tangled in bushes, on sandy soil

1 82 Hugelia
rare on sandy roadside

1 83 Prosopis glandulosa
rare on sandy soil

18
on gentle slope of very alkaline soil at base below rock ledges

1 84 Anemopsis californica
locally abundant in dried seepy places.

x 85 Orthocarpus
very local

1 86 Pluchea sericea

rare
87 Prosopis pubescens
occasional

x 88 Castilleja
very local

scapes of larger plants inflated; flowers yellow. rays bright yellow.

flowers purplish, faded in late afternoon.

flowers blue-lavender, on most plants faded. shrub 2½m tall; flowers yellow. pods on ground.

flowers white.

low bushy much branched brittle herb; flowers white with yellow tips; bracts green slightly purplish distally.

shrub 1 m. tall.

shrub 3 m. tall, flowers yellowish, fruit immature.

erect, up to 1½m. tall, older plants sparsely branched; bracts scarlet distally; flowers yellowish.

1957 Utah-Arizona-Nevada-Calif.

July 7 Trip from St. George, Utah to

Larrea and Prosopis in St. George region of Virgin Valley and west of Beaver Dam Range show absolutely no sign of the freeze of 1936-7. Stems of Larrea to

From the Beaver Dam Mts. to the top of the range west of Paramint Valley (Argus - Panamint Range) is Larrea - Franseria association, except for some stripped flats and dry lakes and the salt pan floor of Death Valley. There are extensive high sand dunes east of Stove Pipe Wells.

The Larrea is generally less than 1 m tall except along roadsides. For a few yards on either side of a paved highway the Larrea bushes are generally 1.5 - 2 m. tall and much brighter green

V July 7 - Lower Rock Creek, 25 mi. n. of Bishop, Inyo Co., Rothrock, Mono Co. ~500 m.

33739 Salix (Heterothamnus) nuttallii common in mixed pine forest among granite boulders

90 Betula much branched globose suffrutescent herb.

common along stream under pines shrubby tree 4 M (others seen to 6 m) tall.

than generally. May be that moisture is trapped under the pavement and that the root system can get at it, even from several yards away. The immediate roadside, for a yard or two, has an abnormal luxuriance of herbs of various sorts.

The top of the pass between Argus and Inyo ranges has only Atriplex and similar shrubs, also down the west slope - only a very few creosote bushes seen on west slopes till the relatively level valley bottom is reached, where there is an area southeast of Owens Lake. Otherwise the uncultivated part of Owens Valley is mostly dominated by atriplex and Artemisia tridentata, etc.

91 Prunus
common in open woodland
on great rocks.
92 Oxyzopsis
do
93 Eriogonum

Lower Rock Creek Camp
is on the Rock Creek at
2500-2600 m. in open woodland
of Pinus monophylla,
and P. jeffreyi (or intermixture
a large 3-needled pine
with leaves 8-15 cm long
and heavy cones with
spines stout, & rough
bark), some Juniperus,
openings filled with
Artemisia tridentata
and Prunus sp., Betula
and Populus trichocarpa
along the creek.
The whole is on the
upper part of an
alluvial fan of
large granite boulders
and smaller debris.
Grayish chipmunks
common.
Oxyzopsis and a tall
Stipa? and Eriogonum
and Gilia nudicaulis
very common.

shrub 1 m. tall, leaves white
beneath; petals white

Lense small tufts.

dwarf shrubs;
flowers bright yellow.

Nov 7. From Rock Creek
pinyon decreases rather
markedly and Artemisia
increases in extent.
The boundary between
forest and sage seems
more abrupt.

Mono Lake appears
rather alkaline. Ducks
are rather abundant. Gulls
common. Piles of pale
clay along edge of lake.

Sonora Pass (9)
is rocky, with sparse
uneven stand of Pinus
contorta var. and P. albi-
caulis. Country rock is
granite with pegmatite
veins.
The Pinus contorta here
has enormously thick and
rapidly tapering trunks,
compared with that in the Rockies.
Maximum 40-45 m. tall 1.5 m. dbh.

✓ July 8 - Tioga Pass
in open pine woods on granite
37794 Pinus contorta var. murrayana
dominant tree

July 10 - south of San Francisco

Ocean bluffs of
shale and fine sandstone
covered by a low litter
~~semi-succulent~~ thick herb
growth, at edges a
succulent garden
of Dudleya, Plantago,
Eriogonum, Cirsophyllum?,
Malacothrix? Iris??,
Yellow Lupinus, shrubby
common a little farther back.
Also Baccharis pilularis,
Leptosyne, Rhus
diversiloba, Erigeron, Lotus,
Artemisia, Achillea, etc.
Many of these are mostly
confined to slightly
sheltered spots. Cirsophyllum
is most conspicuous of
all, at least at this
season. Castilleja ranging
in color from scarlet to orange.
Mimulus (Diplacus) of clear orange
color, very prismatic calyx.

~~tall~~

tree up to 20 m. tall with
thick strongly tapering trunk.

On sand are patches of
a characteristic low
assemblage of Distichlis?,
Atriplex, Convolvulus
soldanella, Jaumea carnosa,
~~Hedeoma~~ Melilotus indica?
Amsinckia?, Franseria
bipinnatifida, Cakile,
Grindelia, etc.
Abronia maritima has
a very enlarged root, to
6 cm. thick, elongate.

July 14 - Dickey Ridge
~~near~~ visitor center
building is a planted
Ilex opaca.

Compton Mt.
Completely wooded,
some rugged rock outcrops
near and at top.
Woods quite mixed.
in places dominated by
Quercus prinus, or Tsuga
by Q. rubra, mostly no
clear dominant.
Species seen:
Tilia americana v. neglecta
Juglans cinerea
Parthenocissus quinquefolia (vine)
Polypodium vulgare
Acer pensylvanicum
Acer spicatum
Hamelia americana
Robinia pseudo-acacia
Ledum telephioides
Rubus odoratus
Rubus occidentalis
Prunus virginiana
Quercus rubra
Quercus alba
Amelanchier canadensis?
Solidago caesia
Silene stellata
Eupatorium purpureum
Aralia racemosa

2740' Dryopteris marginalis
Monotropa uniflora
Monotropa hypopitys
Ostrya virginiana
Cornus sp.
Arisaema atrorubens
Scutellaria ovata
Ribes (spineless var. probably)
Amianthium muscaetoxicum
Hamamelis virginiana
Aster cf. macrophyllus
Menziesia pilosa
Rhododendron sp.
Dioscorea quaternata v. glauca
Vaccinium vacillans
Gillenia trifoliata
Azalea nudiflora
Smilacina racemosa
Monarda
Galium latifolium
Thaspium atropurpureum
Rosa carolina
Hedyotis purpurea v. terminalis
Spiraea betulaefolia
Castanea dentata
Circaea quadrisulcata
Hydrangea arborescens
Thalictrum dioicum
Aquilegia canadensis

1957 Virginia

Galium obtusifolium
Eupatorium urticaefolium
Danthonia spicata
Apocynum androsaemifolium
Rhus toxicodendron
Crataegus macrosperma
Smilax hispida
Corylus cornuta ?
Carya
Deschampsia caespitosa

Achillea millefolium
Tiarella
Solanum carolinianum
Cirsium lanceolatum

below DP 30 m.

July 14 - Compton Mountain
wooded rocky summit

38795 (grass) Danthonia compressa
rare on great rocks in crevices of
96 Cornus rugosa Lam.
between great rocks
97 Monotropa hypopitys
rare on open

Habitats that should be described in G.S.N.P.
Roadside
Roadside edges of woods
Rocky road cuts
Talus road cuts
Talus below roads
Exposed rock cliffs
Shaded rock cliffs

Gaylussacia baccata
Amelanchier laevis ?
Coptotaenia Taeniophyllum ?
Aster (Lanceolati)
Penstemon hirsutus
Antennaria plantaginifolia
Prunella vulgaris

Cimicifuga
Anemone virginica
Rubus argutus
Fragaria virginiana
Erigeron strigosus
Lactuca alba
Rhus glabra
Carya cordiformis

904 m.

crest

shrub 2 m. tall, leaves
grayish beneath
crest, somewhat reddish.

Shaded rock outcrops
Springy places
Meadows on broad ridge tops
Open slopes
Dry hemlock woods
Wet hemlock cover
Quartzite ridges
Shale & quartzite talus
Rock-filled valley heads.

1957 Virginia — OC

Lower deciduous woods
Broad leaf coves.
Chestnut oak woods on steep
Chestnut oak woods on broad
flat ridge tops.
Quercus ilicifolia scrub.
Grit ridges and flats.
Scrub forest on steep
dry west slopes.
Quercus coccinea forests.
Pinus virginiana forests
Pinus rigida forests
Clearings growing up
to thickets.
Swamps.
Wet ravine bottoms
Quercus rubra forests
on high ridges.

July 20 — Washington D.C.
9:40 p.m.

In the flood-lights trained on the Capitol dome were a number of birds, perhaps a half dozen a dozen, flying around and round, apparently feeding on the insects attracted by the lights. They were ~~probably~~ night-hawks (~~nighthawks~~), they had long, somewhat

back-swept wings, the ultimate joint slender and with a conspicuous white patch.

1957 Maryland

July 21 - Sugarloaf Mountain

The mountain is a knot of pinkish quartzite, with cliffs and large boulders near the top.

The whole mass is well wooded with mostly deciduous trees.

The top dome is covered by a mixture of Quercus primus, Q. ?, Betula lenta, Quercus rubra ?, Acer rubrum, and a few pines.

Diospyros

These are Pinus pungens and P. virginiana with a few that look rather intermediate. The trees up here are rather small mostly under 30 cm. dbh. and not very tall. Many dead chestnuts.

The understory, 2-3 m. tall, is mostly Hamamelis, Cornus florida, young carya, Betula and quercus, etc.

On the ground Vaccinium quadrusculata is abundant, some Phytolacca, Rubus, Spiraea betulaefolia, Rhus toxicodendron, etc. Scattered Kalmia latifolia and considerable Vaccinium vacillans.

On the lower slopes the forest becomes taller but thinner, more logged over (not recently) includes much Robinia, Quercus primus, Q. ?, Carya spp.

Undergrowth is sparse - some Acer rubrum, young oaks, locust, hickory, much Phytolacca. Considerable Vitis and Rathbunianum.

At this time everything is obviously drooping from lack of water.

1957 Maryland - Delaware

July 25 - Air trip Washington to Idlewild, N.Y. over Annapolis 7000' alt

The Annacostia river, up to where it abruptly narrows to a small stream, is the color of tomato corn soup about this, dark green. Apparently this is the result of large scale cutting into the clay subsoil as areas being developed as residential sites, as park-way interchanges, and factory sites.

From Washington to Annapolis the ratio of forest to cleared land is estimated at about 3:1 at least to the north of the line of flight. This forest land is a mosaic of all stages of old field succession and mature broad-leaf, ~~and~~ pine, and mixed forests.

East of Chesapeake Bay the ratio about reverses itself, or may even be 1:4. Here cultivation is intensive even though the land looks sandy.

On the coast are large

areas of tidal marsh especially along Delaware Bay on both sides.

The northern edge of the Pine Barrens is being considerably cut into by cultivation. The streams and estuaries here stand out as very black, against the dark green vegetation.

The New Jersey soil is generally light colored along the line of flight, roughly along the Pine Barren border, but is mottled with darker areas, somewhat as the northern Middle Western soils in glaciated areas are.

Northward the Plains area stands out clearly and the stream pattern in it seems to bear some relation to its distinction from the surrounding tree-covered areas. Should be looked into. East of this are considerable attempts at reclamation for agriculture. The same plains, but without distinctive drainage pattern. Also many ponds are dark with white sand showing

1957 New Jersey

Some new black fire scars, with stream courses outlined by brown dead trees, killed but not burned by the fire. Subdivided areas and industrial (?) areas near Rahway.

This (700') is about an ideal altitude for reconnaissance observation.

July 24 - Enroute N.Y. to San Juan, Puerto Rico
21000'

About 1/2 hour out of San Juan superimposed cloud layers were observed - a low layer of puffy cumulus, then a thin layer of strato-cumulus at perhaps 15000-17000', a layer of large very high cumulus from 19000 to 30000' or so. Then a layer of alto-stratus at 30000-40000 seemingly radiating from a center far to the west.

The second layer became rapidly thicker toward San Juan (the sun illuminates the bottoms of the clouds with beautiful effect) then

it disappeared almost completely.

San Juan, Puerto Rico
Airport
Plants seen:

Asparagus sprengeri.
Cestrum nocturnum
Codiaeum variegatum.
Philodendron oxycardium
Acalypha amentacea v. wilkesiana Hort
Polyscias guilfoylei
Melaleuca leucadendron?
Heliconia aurea
Philodendron with bastate lvs.
Dieffenbachia with gray spots
Dieffenbachia maculata
Polyscias tricochleata
Cocos nucifera
tall green stemmed bamboo.
Sansevieria (broad leafed variety)
Peperomia obtusifolia
thick leafed Zebrina (hanging)
Areca sp.? (pedd. Latheri
Alpinia purpurata
Phoenix roebelinii?
Pandanus sp
Yucca sp.
Peddiantheum tithymaloides
Bucida buceras?
Coleus autellarioides
Pseuderanthemum sp.?
Lilium candidum
Lilium regiosa
Lily manfredia

July 26 - Belem do Pará

most main street

The main downtown street is lined with large mango trees, one a two of them with unripe fruit. The trunks are white-washed to about head height. On the main branches epiphytes, mostly several kinds of orchids, are abundant

In a small square are two large trees of Cassia grandis (or perhaps a hybrid involving it, as the flowers have a yellowish tinge). Up the whitewashed trunk of these is a termite gallery. This branches and a gallery runs up each branch, rebranching even on ~~some~~ the smaller limbs, down even to rather small twigs. When this is broken swarms of fast-moving soldiers run out and search the vicinity, vibrating their heads frequently. This gradually subsides over a few minutes. After 10 minutes or so the commotion had quieted and rows of soldiers were quietly standing guard along both sides of each broken [illegible]

Common street trees and shrubs in Belem are

Mangifera indica
Cassia grandis
Rhapis flabelliformis
Livistona chinensis
Roystonea oleracea (or regia)
Ficus retusa
Plumeria rubra
Catharanthus roseus
Pedilanthus tithymaloides
Ixora coccinea
Xanthosoma violaceum
Alocasia macrorhiza
Yucca sp.
Cordyline terminalis
Heliconia sp.?
Cassia fistula?
Lonchocarpus nicou
Cassia spectabilis?
Hibiscus rosa-sinensis
Crinum sp.
Rhoeo discolor
Tabernaemontana sp.? (pink)
Bougainvillea spectabilis
Scindapsus aureus
Ravenala madagascariensis
Allamanda cathartica
Tournefortia bicolor
Calathea (white lined leaves)
Hemigraphis? (purple beneath)
Axonopus compressus (lawn grass)
Euphorbia "splendens"
Polyscias guilfoylei

1947 Brazil

Ornamentals in outskirts
Jatropha gossypifolia
Grossypium barbadense?
(tree 3-4 m.)
~~Oreodoxa~~ Euterpe sp.
Lagerstroemia indica
Mdbrarisans
A few Cocoanuts.

July 24 - trip by air Belem - Santarem - Manaos #
Lv. Manaos 13:10 C-46
Near and around airport at Belem considerable forest, mostly ragged second growth but several patches look relatively good. The second growth has scattered trees from the original forest emerging far above the general level.
The islands near Belem have swamp forest with the top story open but a complete second story mostly of palms. Patches of Montrichardia around the edges. The composition of the ~~trees~~ top layer seems quite diverse, and ~~the~~

On the way to the airport are a number of swampy waste areas covered by a tangle of Montrichardia, Cassia alata (!), Cecropia sp. and other trees, incl. the graceful caespitose palm (~~Euterpe~~ sp.) and tangled with vines, several sp. of palms. Canopy to 5 m. tall, trees to 10-12 m. Some areas of this type have been recently cleared.

A 1:25 Santa Barbara manajó

Broken grassland and forest, forest especially near streams. Streams very muddy. Then mainly forest with tidal streams. A few small clearings.
When there is considerable distance between streams there is grassland, rather dark brown in color, probably marshy, with patches of wood. Very smooth in appearance for about 500'. Small clearings become more abundant, especially near streams.
Paths across grassland stand out as though soil were light colored sand, but soil in clearing is reddish. Grassland patches much smaller to very small.

B 1:25 San Miguel de Pacajuba manajó

Flies reported to green celery marked on July 21 were not on field chart.

C 10:0 n. of Rio Marapi

Practically no grass now except obvious clearings.

1. Large broken cumulus clouds seriously obscure vision over most of this country.

There are some evidences of shifting cultivation, but the greater part of the forest looks undisturbed.

D 7:15 n. of Boca do Casiuma

Solid forest except for rivers. However, what appear to be filled watercourses stand out very sharply because of a lower more fine-textured vegetation. View much obscured by clouds.

E 7:25 Rio Casiuma Rio amazone in distance

Solid forest but with a muddy stream in the distance. A small oval area in the forest appears to be white sand ~~color~~ with scattered bushes & small trees.

Trees even in texture ~~emergents~~ emergents apparently abundant. Color dark brownish green, mottled with lighter & somewhat reddish trees.

F 7:7 Rio Xingu

Crossed large river with some small sandy beaches

and with many inlets on both sides. This river much less muddy than others seen. Inlets are muddy but seem to influence very little the river. Streams running into the inlets are black ~~from~~ some grassland patches near these streams & west side of river. There are brownish straw colored

G 7:30 n. of Igarape acarai

Many streams in forest all black water. Small sandy patches cleared near streams, sand reddish.

Patches & stripes of different vegetation, lower, fine-textured, go from these black streams into the forest. Possibly swamps.

H 7:37 Rio Paramoi

Following is south of a small stream that lies in & on the edge of a strip of grass of some width. Tall grass quite irregular but with no apparent pattern. Huts scattered along stream.

I

Parts of this grassland are wet. Crossed this stream at 8:40

1957 Brazil

after this a large expan of apparently undisturbed forest. Emergent trees quite abundant. Many of them lighter green than the rest of the forest, a yellowish, or brownish or reddish. The yellow ones must be flowering.

Cumulus clouds still about a few large trees are bare, but these not conspicuous from this altitude.

J 7:17 Crossed a small stream
Rio Guajara running north, lined by what appear to be swamp. Farther down, the margins appear to be cleared and sandy forms a larger stream in the distance, running northeast, also with cleared margins.

K 7:52 A few small streams lined
s. of Rio Preto with narrow swamp strips.

Texture of forest varies somewhat locally.

7:57 In distance to northwest vast
s. of flooded area
Rio Pimenteira The water here is dark, not muddy. Much wet grassland, some swamp forest, especially

along a very large reddish muddy river
Rio amazona An island in this
Ilha curuá has extensive grass clearings.

Beyond river again vast flooded, partially wet grassy area. Along the west
M bank of river a narrow, low wooded natural levee, some of sugar cane in flooded land lined with trees, others not.

Many clearings on natural levee of river.

Flood waters on this side greenish, somewhat muddy, not as black as on other side.

Wet grassy areas bright green, mottled with lighter and darker green.

N 3:04 Turned to left somewhat.
~~Lago Grande This may be the Tapajos~~
Much more flooded land.
3:10-13 Also what appears to be many old stream courses. Part grassy part wooded the wood mostly cleared except where swampy.

The pattern of strips of grass, swamp, and forest is very hard to understand here.

O Ramagnas Rivs again very muddy, flooded land with black water. Many clearings much shifting cultivation on islands and strips of slightly higher land.

Patches of what must be Victoria Regia in ponds stand out & very conspicuously look like gigantic duckweed fm 4-5,000'.

P s. of Santarem Away from river the topography roughens and there is little good forest, much shifting cultivation, and some savanna and deciduous forest

Bare trees very conspicuous.

Vegetation here is really very complex. This is the Santarem region.

Where a large black-water ~~[illegible]~~ empties fm a broader area into the muddy ~~[illegible]~~ the area of mixing is very conspicuous and narrow.

Circled, descending 3:15 – 3:29

July 27 Santarem

The soil here on a small hill where a low cut is available is a conglomerate, semi-consolidated, of irregular nodules of ironstone, formed, in the opinion of van Straelen, by the breakdown of an old laterite crust. The matrix is a reddish-yellow loamy material. Below this is an exposure in the street of what may be an actual crust. This may, however, be a compacted layer of the nodules.

Out in front of Santarem ~~between~~ perhaps 1 km can be seen a striking and sharp boundary between the black water of the Tapajoz and the yellow Amazon water. Many small rafts of vegetation in the Amazon part.

Black vultures are present in fair numbers around the city, and have very little fear of man.

Yesterday evening a very considerable number of what appeared to be scissor-tailed flycatchers were flying around a banyan tree at about sundown.

At the airport the surrounding forest is a low mountain dry type apparently much cut over in the

past, rather sparse, some deciduous trees.
The clearing along the air strip

33798 Pachyanthus
edge of air strip

July 27 - air trip Santarem - Manaos
Considerable cleared and brushy land to south of Santarem along Tapajos. Land between R. Tapajos and R. Aripuna is partly ~~about half~~ in grass, some of it with a scattering of small bushes. Boundaries of this are very irregular, not at all angular. Of the forested part some is clearings in various stages of revegetation after shifting cultivation these clearing tend to be angular. A similar pattern is evident between the Rio Aripuna and Lago Grande de Vila Franca.
But westward here the grass rapidly becomes less, except close to the lake. Shifting cultivation evident all through area south of lago, but not extensive.
Route turned slightly southward & the way to west end of lake. Cloudiness and haziness begin to increase, scattered low cumulus. The forest

covered by low semi-herbaceous growth mostly Cassia sp?.
On sandy soil with quartz pebbles. Ledges common, conspicuous.

becomes more continuous, shifting cultivation less and less evident.
Southward, along Rio ~~Ara~~ Aripuna, in the distance, large grassy patches are visible, but rapidly becoming less westward.
Along course sharp dendritic patterns of lower, fine textured forest, probably represent swamps.
Passing south of Lago Grande de Curuai the land is solidly forested.
Cumulus becomes much more abundant.
To south dendritic patterns of swamps (?) first become numerous and abundant. Also conspicuous as headwaters of lago.
Approaching Amazon river bed - 3 irregularly parallel sloughs parallel with the main river. Mosaic of grass and woody vegetation between the

1957 Brazil

On the other side of the River is a vast mosaic of mostly water and light green wet grassland with some wooded land and swamp. As usual, the main channels of the river are muddy, the other water clear or dark. To the south much water, in places more than land. How much of the light green is wet land and how much floating mats of vegetation is not at all clear.

Complex patterns of old channels, especially in Ilha das Onças. Apparently much sand here. Probably the abundant light green is grass on a wet sand substrate.

Passing south of Lago de Pauá most of the land enclosed in the great bend of the Amazon here is inundated. Some sand, grassland, and forest especially along the river bank. Striking meanders of smaller streams here, partly outlined by strips of forest. South of this also mud water and much wet grassland. Reflection of sunlight shows that the light green grass has

considerable standing water between it.

Northwest of the anaya and south of the Parana Uaua is another complexness of water wet grassland and ~~forest~~ forest or swamp, again with a complicated pattern that must represent old channels.

South of the river here is a curious mosaic of low drab-green vegetation with the dark green forest. View not good enough to make out what this is. Some water here but not very much.

Westward of ~~Itapinapa~~ Itapinima and south of Rio Uatuma the landscape north of the course becomes forest again with little water except the Rio Uatuma to the north and occasional small irregular bodys in the forest. But to the south of the course the Lago Faro and Lago Canacari form large bodies of water very complex with bars and islands. In the forest to north of course ravines and small streams become quite noticeable. In general, there

is for more water than one gets ~~any~~ any idea of from the USAC charts.

Lago de Arari, in the distance to south forms a much more impressive body of water than appears from map.

The forest between the Rio Uatuma and Amazon appears not at all disturbed by man, very much cut by dendritic stream pattern, the more important streams to be lined by swamp. This stands out very sharply in late afternoon sun, both because of shadows and color difference between forest and swamp, the swamp being a drabbish green, rather than the dull dark green of the forest

Rio Uimbu is extremely complicated and is certainly cut down into a slightly elevated plain. This impression of a slight rejuvenation has been increasing since Itapiranga.

South of course the Amazon has sloughs along both banks, not so close together as most of those

seen previously.

North of course the rejuvenation has increased so the ground actually looks hilly. All densely wooded, but with swamp forest occasionally along some streams.

Along Amazon west of Casa Casimiro is some cleared land, especially along the north bank which is somewhat high. South bank is lower and with much water and wet grasses.

The north bank has low bluffs 20 m. or so high, in places worn down to slopes. Westward these bluffs become a bit higher and more sinuous.

Vast stretches of water to south.

Island east of Manaus has considerable areas of forest that seem in very bad shape, possibly the trees have been killed by burning or girdling. These patches are irregular.

Approaching Manaos the bluffs are higher and much dissected. Mostly wooded. Land back of them dissected and wooded.

clearings become more and more numerous

1957 Brazil

July 28 - 41 km n. of Manaos

tall rainforest trees 30-40 m. tall, gradation of sizes from 10 cm. to rarely 80 cm. and spaced from 2-5 m. with abundant saplings and shrubs

Trees Lapotaceae, Leguminosae Lauraceae, etc.

Palms principally in undergrowth.

Undergrowth is fairly abundant, 3 to 4 m. high. Can walk freely but must push bushes aside.

Very few ferns, some herbs such as Cyanta, but much ground exposed, covered by leaves. A brownish gray clay surface with no evident organic matter.

Many epiphytic lichens, mosses, Hepatics.

Many Araceous vines clinging close to trunks - Philodendron, Syngonium, etc.

Canopy here rather thin perhaps 75 to 90, locally thicker.

The tree habit here is characteristic, clean trunks, umbrella top. Has been selectively cut over for economic wood.

Leaf litter layer, especially in undergrowth, abundant on old leaves, even thru such as palms that persist.

This general area, between here and Manaos is a dissected block of fine sandy sediments slightly bedded, pinkish in color. Here and there in cuts may be seen a thin layer of small concretions, not comparable with the bedding. Said by Stamberg to be concretions formed in situ without relation to bedding. The cuts are frequently darkened by a thin layer of algal discoloration, dark manganese purple in color.

Between 21 and 22 km. north of Manaos are small areas of grayish white sand, really podzolic in appearance, with a thin yellow-brown layer on top. In some profiles, as immediately below bottom of thin dark gray material

1957 Brazil

The vegetation here is different, but has been burned over, so is not to be taken as necessarily typical. Besides shrubs of various sorts Pteridium aquilinum, Lycopodium cernuum, Paepalanthus, and several grasses are prominent.

Cleared areas in the forest are largely grown up to several species of Cecropia. Toward Manaos the entire

July 28 - 21 km. north of Manaos
On white sand in open scrub.

38799 Paepalanthus

38800 (algae) forming crust

July 28. 10 km. north of Manaos

01 (algae) Thin crust on vertical road cut in pink fine sand.

vegetation becomes a secondary thicket type with abundant palms of several species, Cecropia, Vismia, melastomes, and tangled with vines. Shifting cultivation being practiced here and spreading along the road.

1957 Brazil

Letters refer to red letters marked on WAC charts avg. A

Aug. 1 - trip by air from Manaos to Santarem (in Catalina, south side of plane)

Ravines in tertiary terrace are rather steep walled and the walls well wooded, black water in bottoms of part near river.

Smaller islands are a series of subparallel channels and ridges, channels with water or wet herbaceous vegetation. Difficult to be sure if "wet grassland" seen on trip up river is always grass or if perhaps some is floating vegetation. carried. Large island below mouth of Rio Negro is

B largely wooded, many of trees leafless at this time. Many clearings along south side. The lake is greatly enlarged now and some of wooded strips are still flooded, the trees sticking out of the water. Areas of herbaceous vegetation, perhaps floating, with mostly leafless trees with white trunks scattered through them. ~~Co~~ Down

C stream somewhat, still an island, and strips of leafless trees separated by green strips much narrower (Camargo says the trees floss leaves during inundation. Certainly those on lower ground are the leafless ones. (b+w. photos 4 & 5)

Shallow spots along banks with a blue-green vegetation, probably largely Pistia. Much of the herbaceous vegetation is floating, and when the water rises (acc. Camargo) it detaches itself and forms enormous rafts, to 200-300 m. long.

About 1/4 the trees in some areas, almost all in others are leafless. A few are in flower.

Systems of old meanders and channels and "restingas" & natural levees are very complex. The endored water is dark and with little silt.

~~Are~~ New bars covered mostly by herbaceous vegetation.

Montrichardia swamps seen almost from time of leaving Manaos.

A few houses on levees.

1957 Brazil

In addition to elongate channels on the islands there are roundish & slightly lengthened ponds, the smaller ones filled with floating vegetation.

D Ilha Serra-Grande is a much more mature example of the islands built up of successive restingas. Mostly wooded with a few channels and meanders. Some elongate areas toward the lower end appear to be Monticharia swamps with sparse tree cover.

The Amazon is café-au-lait color, all of the still water dark brown.

Below here palm swamps appear. Extensive Monticharia swamps, large areas of floating vegetation. Meandering channels lined with strips of forest.

Calycophyllum spruceanum
Hura crepitans
Triplaris surinamensis
Crataeva benthamii
commonest trees in mouth

grasses Paspalum fasciculatum
Echinochloa polystachya
Hymenachne amplexicaulis

yet geological map of Brazil 1/5 000 000 Mapa Geologico do Brasil 1942 Serv. Cartografico do Conv. Litho-graphico Ypiranga, S. Paulo. Dirtr. Divisão de Geologia e Mineralogia, Ministerio da Agricultura, Rio de Janeiro.

E South of river E. of Ressaca. Many trees in forest just coming into leaf, some, prob. Tabebuia and Triplaris, in flower.

One way to distinguish floating ~~grass~~ ~~grasses~~ vegetation from wet grassland is by the existence of trails existing in the latter. Some grass floating, some attached. In some floating mats of grass the center appears dead, the margins green.

F Area west of Parintins. Large areas of grass, both attached and floating, mixed with some patches of wood. Occasional Victoria regia. Herons (white) fairly common, gregarious.

Grass may be attached but in water to 3-4 m. esp. specs of Oryza. Some clearings here and houses on piling. Cattle grazing in water.

Patches cleared with large bundles of jute macerating in water.
Tree with white trunks mostly bare, seem to be Triplaris.
The wet grasslands in many places are grazed.
Jute is only produced near the water.
Low P-L to 2 m. of Paintins.
colon 5-6 to 14 m. of Paintins.

G Paintins - old Japanese colony, plantations of rubber & Brazil nuts.

H Below Paintins an area of magnificent rain forest with scattered trees bare, many with new light green leaves, a few in flower, bright pink and white, some with white or yellowish flowering vines over their tops. Emergent trees common. The various shades of green and other colors making a vivid mosaic. Palms very common in canopy but not as emergents.

Forest of slightly lower elevations, possibly swamp, distinguishable by lack of emergents, lighter general color. Babassu palms.
rest of both rolls taken of the forest east of Paintins, the last dozen or so of them with telephoto lens.

Eastward a few shifting cultivation clearings, especially but not all along a small watercourse, mostly hidden by forest. Small ravine in forest have fr. predominantly palms. This is on the Tertiary terrace.
Eastward, in Rio Anipiunis drainage and north of it a few small hills.
I Stream courses lined with babassu palms.
Small area, perhaps former clearing, pure stand of a smaller palm.
Hills more numerous eastward north of main part of Anipiunis. More shifting cultivation. Swamps immediately along river.
J Patches of scrub savanna with small scattered acaulescent palms, some trees. Old stream courses with white sand.

Rio Aripuana has black water, occasional white sand beaches, mostly rather steep banks.

K Forest here has less trees without leaves and less with young leaves than back a bit, more somber green color. Some small sand barrier ridges in edges of river, also hooks at ends of capes, pointing upstream. All this in "estuary" part of stream.

Shifting cultivation clearing in all stages of cycle.

Between Aripuana and Tapajos some beautiful

L forest with numerous emergents with light deep yellow flowers. Some other flowering trees, a few bare ones, palms with what appears to be distichous leaf arrangement (Oenocarpus).

Rio Tapajos has white sand

M beaches on west bank, also low pinkish bluffs there bare.

Much higher isolated

N hills (200 m.) east of Tapajos near Belterra. Alter do Chao. Tertiary erosion remnants. Some these bare or almost so.

O forest on this side seems more dry, far more trees bare of leaves, some areas almost savanna.

Narrow white sand & pink sand beaches, pink bluffs.

Tidal influence here makes sand spits pointing upstream. Some siltiness from Amazon noticeable here.

Laterite boulders at base of some of the bluffs.

Some sand points are covered only by scattered shrubs.

Contrast between the dark clear water of the Tapajos and the light café-au-lait of Amazon.

Islands across Amazon

P from Santarem are of parallel strips of restinga, wet grassland, and water. Separated by large channels of the Amazon and containing ponds and large to very large lakes. Much clearing of restinga and swamp, the latter for jute. Vast Montrichardia swamps around lake.

Canals cut through restinga

1957 Brazil

Lago Grande
from Amazon to large
Q lake by Camargo to et
in silty water to fill
lake and make land.
The filling is very obvious
at the inner part of the
two largest canals. Herd
of water buffalo. Here the
water runs into the canal
because of evaporation from
the lake. Drops an enormous
load of silt. The lake is
very muddy in comparison
with other lakes of this sort.
the current into the canals
is very noticeable.
Large patches of Cecropia
in restinga, representing
abandoned clearings. Separated
by patches of degraded all
forest. Triplaris in flower
here & there. Much jute along res.
Around channels and
small lakes the wet
grasslands extend out
over the water as floating
mats.

Aug. 1 - boat trip Santarem to
Maycuru, on north bank
of Amazon below Santarem.
Small floating rafts
of grasses occasional.
Along north shore, on islands
pioneer situations occupied
by Salix Martiana,
a stage later Cecropia sp.
on restinga and cleared
land. Salix of several ages,
up to perhaps 15 m. tall
Some large areas of
flood plain or low restinga
dominated by Mauritiopsis caladensis.
In places mixed with
other small trees. Form a
compact layer about
6-8 m. tall. Here and there
are patches of rather
tall ~~flood~~ forest of Calycophyllum
Triplaris and a number of
other species up to 30 m. tall,
rather ragged
Indentations in bank
tend to have floating grass
mats, prominences tend
to be eroding rapidly,
so that trees are down along
the banks. Triplaris in
flower or fruit, white.

Flug. / Mayaruna

Clearwater low ~~[illegible]~~ ~~[illegible]~~ with loco channels, muddy with Ipomoea erecta on muddy flats — a pasture weed. Tenn fishing in canal.

In old canals
Jussiaea
Pistia
√ Eichhornia
Neptunia oleracea
Aeschynomene
Cyrodactylus covers floats.
In flats in village a grove of coconuts, mature, but mostly not very productive - attacked in terminal bud by Rhynchophora sp. and by a moth larva. Some trees rather loaded. Perhaps look poor because of using green nuts.

Here Camargo has his largest canal, cut through the restinga. The muddy water flows in at a rate of between 1 + 2 M. per second. This said to be because of the enormous evaporation

from the surface of the lake.
The vast wet meadows grow on a muddy soil that will not support the weight of a horse, though it is traversed by Indian buffalo of which there are 1600 head here, feeding in the wet meadows. Produce a very rich milk which makes good cheese.
The lakes, which normally have dark clear water, here have muddy water as in the Amazon.
Water very seldom flows out of the lake, only once in 3 or 4 years, then at driest season for about 2 weeks it flows in and out with tide. Tidal fluctuation 20-25 cm.
The land that is built up by sedimentation by the water from these canals is firm because of the proportion of silt and fine sand. When dry will support a horse or station wagon.
Considerable Eichhornia in patches on lake, but not excessive.
Salix martiana, small tree, have enlarged bases and conical, with bushy roots at top of cone and above.

only perennis

1957 Brazil

Large white herons, bitterns, terns, a cormorant or gannet-like bird, etc. are common. Tern looks like Thalasseus. with large yellow bill and habit of bobbing it. What appear to be boat-tailed grackles common near village. Several species of small shore birds, a hawk, and small thrush-like birds with yellow front parts.

Aug 2 Belterra

The rubber plantations have a ground cover of Pueraria sp. The variation in leafing out is explained by Townsend (geneticist at the plantation) as due to various clones used in top working the trees.

The soil here is dark and has a fair clay content. There is said to be a correlation between areas of dark soil and extensive Indian occupation.

Aug. 2 - Santarem to Belterra
low hills partly grassy, partly wooded, mostly showing clearings in various stages of revegetation.
Forest becomes more luxuriant toward Belterra, grass disappears.
At Belterra are large areas in Hevea. Different fields are in different conditions. Trees are quite individual in leafiness, from bare to fully leafed out. In some fields many trees appear to be dead (possibly not.) but are not.
Belterra - 4 months dry season. 90" rainfall, 90 percent of which is in the wet months.

Second growth very thick - conspicuous genera Erythroxylum, Mabea, Bellucia, Vismia, Miconia, Davilla, Tabica, Randia, Tabernaemontana, Siparuna, Casearia, Drosera, Cecropia, Attalea.

Pariana - Amazonia only, all in forest.

1957 Brazil

~~Aug.~~ Aug. 2 - Pindobal

photos

Broken-down primary forest, largely palms - Maximiliana etc. at least near river. Calycophyllum spruceanum, Cochlospermum many other trees.
Coopalfers

"Bordo dos Viveiros"
edge of plantation
Broken down primary forest - tall trees of Piptadenia, Bertholletia, Babassu, many other large trees up to 40 m., now sparse, - [Alchornea (or Aparisthmium) cordata] canopy incomplete, because of several years of selective logging, now has a thick under layer 4-6 m. tall or more. Trees up to 1 m. diam. but now these are rare. Some buttressed, others fluted.
The soil here on the "Planalto" is gray-brown stiff clay on the surface, more yellowish below, very stiff clay - yellow latosol ac. Pay. Planalto is a tertiary alluvium.

Para

Letters refer to red letters marked along aug. 2 trail in WAC diary.

Aug. 2 trip by air from Belterra to Belem (south side of plane)

A — N.E. of Belterra most of the Planalto is under shifting agriculture, some patches of forest left but mostly in ravines. The Planalto here is quite dissected by steep walled ravines. Cycle here must be fairly long perhaps 5 or more years, judging by proportion of fallow land.

B — Down on lower terrace there is much shifting cultivation, too, but at least half the forest remains except near Santarem.
The Amazon is a braided stream on a gigantic scale.

C — N.E. of Lago Grande is an area of savanna with thickly scattered trees and thin grass. It seems heavily grazed, in places definitely overgrazed. In some places it is open with patches of trees. Cattle trails cross the grassy parts everywhere.

D along the ~~inner~~ north margins of Lago Grande are abundant palms growing in the water (at this season). The muddiness of the lake, from the canoe, reaches to some extent even to this side.

E A small range of rather abrupt hills (said to be Carboniferous), beyond them some savanna. Scattered hills extend off to the north. ~~In the~~

In the wet grasslands F along the north side of Lago Grande are spectacular meanders of old channels. (shown somewhat on map). A few scattered houses in these wet grasslands along these meanders.

Along the south bank of the Amazon opposite Ilha G Caruna are conspicuous light brownish yellow low cliffs. Scattered houses, and clearings along restinga below Ilha Caruna on south bank.

Between Lago Tarumã, Lago H Maracú and Rio Purusinho are what appear to be extensive Mauritiandia swamps

with scattered trees

Lake at head of Rio Purusinho I is irregularly patched with numerous small islands of various sizes. Small patches of dry savanna south of it. These are either man-made or man-extended as their margins are in places angular and there are scattered houses and buildings. Many ponds and channels of black water. Many of the ponds have one or even two circular islands in them. One had 3, one at each end, one 1/3 the way from east end.

J Streams running northward into Rio Purusinho, R. Purú, and Amazon have broad strips of what looks like tidal marsh. A little shifting cultivation on higher ground along or between some of these streams.

There is apparently much water in this area and to east, covered by thin vegetation. In places looks almost like glaciated muskeg terrain.

This sort of thing very sharply set off from forest on somewhat higher ground.

More and more cumulus clouds.

1957 Brazil

K

Farther east "tidal channels" become very conspicuous, even at some distance from the Amazon. These are either in wet grassland or Montrichardia swamp. Too high alt. to tell, looks brownish green. Land is definitely flooded but vegetated. This terrain is sharply set off by its brownish or yellowish-green color and entirely different texture from the slightly higher forested land bordering it to the south and in islands in it. The inundated land is extensive and extends dendritically southward into the forested higher ground. It extends from about along our course north to the Amazon.

L

along south edge of this inundated area, farther east, is a belt of palm forest, ranging to savanna, with hummock-like islands of dicot forest.

This is just west of Rio Xingu. Boundary is very irregular, width varies from very narrow to quite wide, and dendritic extensions reach up into the forest just as the inundated land did a little

farther west. These palm strips may have been what I took for swamp about here on the trip from Belem to Santarem. (not entirely but much of it) (Ilha, Santarem)

This has been roughly following Rio Jacaria. A tributary of it from the

M

south, west of Rio Xingu is a broad strip of what is probably wet grassland with much Montrichardia swamp, a few small patches of palms.

East of this stream is slightly elevated, somewhat dissected wooded land with narrow branching fingers of palm forest. By the nature of this pattern these palm forests must mark small stream systems, but the streams cannot be seen

N

Some grassland with areas of palms on west side of Xingu. parts of this may be rather wet. Does not extend more than a short distance up the river,

O

very little developed on east bank of Xingu. A few old channels, C lakes, etc on east bank, filled with wet grassland. Some narrow white sand beach, but broken.

P Small stream running north, east of R. Xingu, in narrow strip of wet grassland. Has at least one farm south of course.

Q East of this is what seems to be an old channel, running north, rather wide of white sand with a sparse scrub (plots).

R East of the Xingu the dendritic patterns in the forest are definitely not palm forest and definitely do follow stream courses, appear here to be narrow flood plains which have been rejuvenated, have a meandering ravine in them. The vegetation on these flood plains is conspicuously finer textured than is the surrounding forest. In the surrounding forest are more bare trees and much more variation in color of the trees.

R. Casiri / Baia Casiri S The ~~Rio Casiri~~ before ~~before~~ it enters the ~~Rio Xingu~~ has a spectacular drowned ravine pattern, with the green islands and peninsulas standing out very sharply against the black water. The land here is somewhat higher than the water, so

there is no inundation but low wooded bluffs.

T East of and south of Rio Casiri are some slightly dendritic grasslands, apparently occupying old stream courses a narrow flood plains, now left stranded.

Some shifting cultivation here along south bank

U before river narrows to form the narrow winding channel called Rio Araparí.

V Some shifting cultivation along both banks of this. Here some old dendritic flood plains are covered by forest locally largely of palms.

W To the north a very irregular grassland possibly occupying an ancient flood plain, quite wide. A few narrow ones of this sort, just north of Rio Arara. These seem definitely to be stranded flood plains.

X North and west of Baia do Portal are some rather large grasslands, no obvious pattern - near Malgaço. Tajapurú Estrecho do (Tapiraru) angle

across into the Rio do Para. then Rio marries Great Breves and several other small villages.

Rio do Para starts as a series of parallel curved channels slightly braided.

The main channel of the Estrecho do Japim is extremely muddy, the others almost as much so.

The islands between these channels, as well as those of Rio Para are almost solid forest. A few little irregular grassy patches, numerous shifting agriculture patches, mostly on the channels.

More small patches of grass as we go east, north of Rio do Para. also more shifting agriculture and irregular patches of a different, darker green, sort of palm.

Many large channels or straits coming south from Amazon to Rio do Para, all very muddy. Eastward along Rio do Para many very irregular small savanna (photo). Then a sizeable area where the grassy parts exceed the wooded parts, this rather

well away from the Rio do Para, north of it. Pattern of forest and grass intricate (photo) appears to be dry, from appearance of the very few trails must be sand; grass seems to be rather tall, scattered bushes and small trees in parts. Several parts of it have been recently burned.

Eastward of this some smaller, less intricate patches of similar grassland generally forest, considerable shifting cultivation. Irregularity of pattern of this, similar to that of the savanna patches, suggests that this may have been the origin of the savanna.

Considerable area of the forest east of here are of lower stature, much finer texture, than that surrounding it. In the almost like a scrub. In this are smaller patches that are almost savanna. This complex may be secondary after shifting cultivation, but the boundaries are neither sharp nor angular.

East of this there is an extensive network of channels

of various sizes among
islands of various size.
Northward much savanna,
with a small proportion of
forest, but changing locally.
Much shifting cultivation
on some of the islands, with
houses along channels, also
many ~~to~~ boathouses.

The island area is generally
wooded except for clearings;
north of the island complex
the savanna-wood complex
continues eastward, extensively.

The forest in the islands
has many palms, through
not predominantly palms.

Rio do Para has become
enormously wide.

The savannas to the north
become more and more extensive
C and with less forest, and
the island complex disappears
eastward, the savannas
finally approaching the bay of
Rio. Eastward, also, they
D have generally many
scattered shrubs and
small trees.

South bank of Rio do Para
a Baia do ~~Para~~ Marajo varies
E between yellowish ~~sand~~
beaches, very low ~~wooded~~ bluffs,

to occasional stretches of
very low bare light colored
cliffs.

F Much shifting cultivation
in the area west of Belem.
All stages of revegetation.

1957 Brazil

Aug. 3. Uriboca, 20 km ± northeast of Belém

Tall rain forest, up to 30 (45) m. fairly closely spaced, trunks tall clear for as much as 20-25 m up to as much as 1 m. diam. thick without the buttresses, many of larger trees with conspicuous buttress up to 3-4 m. high and 1-2 m. wide at base.

Commonest tree here, Munga (Eschweilera coriacea odora
Parinarium sp.
Guttifera glabra)
also Couratari tuberculata 1.5 m. diam. flanged.
emergent.

Parkia sp. – enormous buttressed trunk

Canopy almost closed large trees 10-15 m apart small ones more numerous 2 m ± apart. a conspicuous layer 0-2 m. tall of seedlings of the canopy trees.

In the other undergrowth some climbers, and Carludovica. Few herbs except climbing Araceae.

Soil a gray-brown sand with abundant laterite fragments of various sizes & small boulders.

second story of small trees very irregular in height, not sharply separated from the seedling layer or from canopy layer.

Protium with very small leaflets, much like Protium in Ceylon.

The spacing of trees in this forest varies considerably locally, some large trees seen as close as 5 m. apart in some numbers.

Small epiphytic bryophytes and lichens common on trunks, but no leaf epiphytes seen. Myrmecophilous plants common, several kinds.

One can walk freely through this forest without cutting.

1957 Brazil

Est. do Pará

v Aug. 2 - Belterra, "Bordo dos Viveiros, Rio Tapajos in ~~mixed forest~~ somewhat disturbed forest on clay soil

38802 sub. occasional — tall tree with deeply fluted trunk 50 cm. thick; fruit immature.

1 03 Virola occasional — tree; flowers yellowish.

2 04 Pouteria Lista Eyma det. T.M. Pires July 1984 occasional — tree

v Aug. 3 - Uriboca, northeast of Belém In edges of rain forest on sandy soil — erect.

1 05 Olyra latifolia common — shrub 3 m. tall; stems; branches rather subscandent.

1 06 (Hemad) Sparattanthelium common

Aug. 4 - air trip Belem - Santarem Manaos. (north side of plane) A few patches of pepper (Piper nigrum) in vicinity of Belem.

Letters A, B, C after the first letter entered along with the date. Aug. 4 W to E

A Baia de Marajó is very muddy light café au lait color, opposite Belem. The inlands outside of Manaos ~~seem to be~~ are mostly covered by what seems to be undisturbed swamp forest — except for some clearing on the ~~three~~ largest. Patches of Montrichardia occasional among the trees.

B The savannas in the eastern half of Marajó Island are covered by scattered shrubs & small trees.

C West of the savannas for a short distance the clearings are mostly immediately along

the streams or channels.
Westward somewhat, toward Rio Canaticú and beyond, they are away from the channels and scattered in the interiors of the island. Perhaps this reflects the distribution of "terra firme" (vs swamp).

D

Westward, perhaps between Pirie and Breves, are more savannas, in smaller patches than those in the eastern (half) of the island, but amounting to a large total area. These have some scattered shrubs but far less than those in the east. Just east of the Rio Pracuúba ~~Ilha de Joanes~~ ~~and Belém~~ are small patches of a different sort, probably secondary (pasture) being erroded.

E

All of the streams and channels in the Marajó Island (with one small exception about in the middle of the south coast) are extremely muddy as are the Rio do Pará and the Baia de Portel.

West of the Melgaço are some ~~of~~ savannas areas, mostly not as extreme or as sharply delimited as are those

F

on Marajó Island. West from here are a few smaller openings, mostly apparently along old stream courses.

West of the Baia de Portel so far as can be seen, the streams are all clear or black water, no mud noted.

G

In some of these around the lower Baia de Caxiuna are large numbers of Victoria regia. Baia de Caxiuna is black ~~water~~ or clear water.

Cumulus very numerous obstructing view a good part of the time.

H

On west side of Baia de Caxiuna are scattered houses along the shore and clearings back from them, many of them being revegetated. An conspicuous

I

savanna apparently occupying ~~a farm~~ the bed of a former arm of the bay, south of the Rio Caxiuna, with some water in center.

West of here no more shifting cultivation or clearings or savannas seen.

J

Many trees in flower in the canopy of the forest.

K

Several streams east of Rio Baixo Xingú lined with belts of dry savanna.

Large savannas west of lower Xingu around Paraiso. L These extending westward into extensive forests of palms fingering as dendritic patterns far into the main rain-forest, which is very dense and continuous here, ~~interbroken~~ westward to the wet savannas bordering the Rio Pumasinho.

Cumulus very abundant.

Victoria regia abundant in streams ponds, etc. south of N Rio Pumasinho.

Patterns of flooded land and patches of dry savanna and forest ~~south of~~ this river are very O intricate, not easy to interpret from air.

Broad belt of wet savanna and flooded land south of P Arraya well east of Santarem. Extensions of this into forest with abundant palms. Victoria regia in water, locally very abundant.

Parts of the wet savanna have a brown color. Victoria regia a light "duckweed" green. ~~Green~~ Areas of coarse grass & rushes or floating bright light green. Monticharden swamp (?) dull green.

Q Dry savanna north west of Lago Grande has abundant

scattered bushes and small trees in most parts. Has been in parts ~~too~~ badly overgrazed so much red and white sand shows. Western part is especially this way.

A road traverses the western part (a two roads), merely two wheel tracks visible from air. Some small areas have been burned rather recently.

Santarem — Back of Santarem the forest is sparse on flat areas and rough overgrazed, clearings on hills except some that are R cleared. Bare ground shows with cattle trails everywhere. The airport. Much of this sort of ~~the~~ scrubby woodland between Santarem and Belterra. Some is really savanna with abundant trees.

S On the Rio Tapajos is what appears to be a bloom of algae, locally concentrated by wind so as to be visible from the air.

Across from Santarem on T the peninsula between Rio Tapajos and R. Arapiuns, between Vila Franca and Boa Vista are large savannas with few

trees. In the middle of one of these a fire was burning, already having blackened a substantial area. Scars of older ones also seen.

Many sand beaches and spits around lower Anipuru.

U Variability becomes poor because of beginners.

Old stream courses show up in plan as sandy stretches with open scrub. Usually a strip of differentiated vegetation bordering these and connecting different patches along same old stream-course. East of Paintins.

West of Paintins is a vast area of land, mostly flooded at high water, with only its restings a natural levees remaining dry. It is a complex of meanders, old channels, levees, wet grassland, poaks, lakes, swamps, etc. Large sheets of water with numerous small islands; even single trees growing in water.

In places has the appearance of a labyrinth of channels.

W

X S.W. of Ressaca a large meander cuts off abruptly a series of parallel channels and bars.

West of this east of Lago Caracari is another labyrinth of levees, channels, islands, etc. and the whole area immediately surrounding this lake is unbelievably

Y complex, a drowned shoe-bog of wet savanna, black water ponds and inlets, patches of swamp forest, and levees and channels.

Z West of it the terrain changes first to predominantly Montrichardia swamps (?) then to forest, much interfingering with from the aerial photographs is a very conspicuous road cut thru the forest, showing up bright red.

The joint-crack structure described by Sternberg seems to show up well here, stream intersections and turns ~~are~~ mostly forming right angles.

Even where the streams cannot be seen, their courses are marked by strips of lighter green finer textured vegetation in the dark green of the forest. Forest otherwise rather uniform except for rare patches of very large pale green trees that show up against the dark green background.

A

B

The ~~Rio~~ Rio Urubu below Sao Raimundo is a striking drowned system showing the joint-crack structure rather well. This is, of course, up on the Tertiary terrace rather than on the flood plain.

C

Another drowned system, much more complex than shown on the map, on stream above Casa Casimiro, east of Manaus.

D

West of here a few small savannas, apparently with white sand, probably ~~due~~ resulting from clearing and burning.

E

Aug. 4 - Santarem, Est. de Para
In cleared sandy ground around airport.

3	8807	Cassia common	suffrutescent herb to 2.5 m. tall
2	08	Turnera rare	~~sh~~ low bushy suffrutescent herb; flowers yellow.
2	09	Cassia common	low spreading shrub
2	10	Fimbristylis occasional	cespitose in small tufts.
2	11	Borreria latifolia? occasional; frequented by finches (Klampis)	spreading, somewhat elongate herb; flowers very pale lavender.
2	12	Cassia dominant over much of area	stiff shrub 0.7 m. tall; flowers bright orange-yellow.
1	13	Turnera common	flowers very pale blue.

Aug. 4 - Manaus
Cultivated plants noted:
Ficus retusa (common street tree)
Mangifera indica
Alocasia macrorhiza
Hibiscus rabdariffa
Polyscias guilfoylei
Dracaena sp. (leaf to 50 cm. long)
Cordyline terminalis
Cyperus alternifolius
Polyscias fruticosa
Dieffenbachia maculata
Lagerstroemia indica
Alocasia (large pinnately lobed sp.)

Aug. 5 - airstrip, Manaos - Teffe
(north side of plain)
(6:30 a.m) Peninsula between
Rio Negro and R. Solimoes densely
wooded. Slightly dissected.
Wisps of mist lying in low
spots, vanishing rapidly.
Apparently this is part of
the Tertiary terrace. Several
farms and shifting agriculture
along west bank of lowest
s.w. bank tributary
of Rio Negro. This group of
tributaries makes a rather
intricate drowned system
that shows the joint crack
pattern very well.

There a thin layer of very
low clouds or fog made visibility
poor for a short distance, then
this thinned out until it
lay only in the shallow
ravine, bringing out very
well a roughly rectangular
pattern - not quite rectangular,
about 80/100°. Entire area is
densely wooded. The drowned
river system emptying at
Manacapuru shows this
also, but not clearly. It is
very intricate, the dissection
here being much finer
than to the east.

Just west of this a solid

very low cloud layer.

Opening in clouds at what
is probably ~~Lago Anaman~~
The western extension
of the south branch of the
drowned drainage system
~~(or perhaps Lago Anaman)~~
7 a.m. It has a conspicuous
settlement on the north bank with
clearings.

One small clearing noted
to west of western arm of
the system. This system is
also very intricate, especially
just east of the settlement.
Still a more or less rectangular
pattern, but not too clear.

Small lake east of Lago
Anaman also a drowned
system but not much more
intricate than indicated on
the map. I suspect, judging
from its position ~~on~~ in rela-
tion to Lago Anaman that one
or the other is wrongly placed
on the map. Lago Anaman too
far north or the other too far
south. Anaman also no more
intricate than on the map. Both
show angular structure
very well. South end of
east part of Lago Anaman
has cleared ~~patch~~ bank, several
houses, other grassy clearings
nearby.

A set letters on work sheets and air photos

B

C

D

E

F

G

Another smaller drowned system with considerable grassy clearing around it south of main body of Lake Anauman, west of south end of east arm. These clearings are mostly very green.

Low cumulus and strato-cumulus too thick westward, for good visibility.

7:14 Series of ponds surrounded by grass, ~~entire mouth a sky[illegible] could be bbs~~.

I ~~Anori inlet~~ P. Solimoes visible on left of plane. Otherwise all is densely wooded.

Low layer of thin wispy clouds not enough to obscure visibility completely.

J Upper end of Anori inlet also has considerable clearing. Clouds thicker westward.

7:36 Considerable cleared area but

K not very visible because of construction of plane - mostly beneath. To north densely wooded.

Long inlet ~~west~~ of Codajay

L shows striking angular pattern. Visible only in distance.

Below mouth of this inlet

M the Tertiary terrace apparently comes right to the bank

of the Solimoes. At least there are low bluffs. At

N mouth of inlet there is a narrow flood plain island. Passed mouth of inlet at 7:40.

Big loop of main channel

O of river enclosing large islands with typical pattern of channels, levees, lakes, ponds, etc. River is very muddy. Much less wet savanna and floating vegetation and more forest here than on similar islands below Manaos. Visibility rather poor but possibly some shifting cultivation here.

A thick layer of cumulus below and Nimbus or stratus above, and rain on the window obscured visibility.

7:40 Glimpse of two fair sized

P Q lakes or channels north of the river with what appear to be fair areas of wet grassland.

Q P Islands across from Camara have some wet grassland in interior in patches, mostly forested. Some of this may be floating vegetation on the lake margins.

At least one house and small clearing

R on southshore of upper island.

S The island west of Cavara has dense forest but the lakes are bordered by grass, possibly partly floating.

T Above this island the north bank is densely forested. Visibility very poor.

9.05 U Large lakes north of river. Slightly higher ground with scattered bushes and clearings between lakes and river. This apparently just west of 63°.

V Clearings have tall straight trees with umbrella like crowns left scattered in them.

The forest on the island S

W south is rather uneven but largely of trees of this habit.

8.14 Landed on water at a sizeable town on low bluffs of red soil, perhaps 10 m.

X high. A rather bare town, few trees except a clump of two of coconuts, one or two other rather large trees - mango ~~trees~~, perhaps.

West of town where river turns north the bank is high and red

Some clearing along the west bank of the river to the

across from here rather recent.

Visibility obscured by rain.

Bend to W & S

A Island across from 7 7 does appear apparently all wooded except narrow cleared strip with scattered house, at least one new clearing inland.

West of this in the south reach as nearly as can be made out through holes in the clouds, all is tall dense forest.

West on the north bank

8.40 C is some grass, but too obscure to see if it is clearing or wet grassland.

Clouds are very thick, we are following river. Raining

Many lakes and ponds visible to north, but no details. Some of the closer ones have some grass around them, probably wet grassland. Some flooded land with trees. Lakes become isolated westward with less grass. Then more numerous. Here a few areas of low scrub, possibly on slightly higher ground, no patch like a low elongate ridge.

8.50 Westward rather uneven

D forest, some patches finer textured and lower. In taller forest quite a few leafless

a just leafing out emergent trees. A few scattered tall bright yellow ones in full flower.

Then a large area of lighter color, moderate height - possibly swamp forest - inundated forest. Stems sharply set off from darker green forest to north, possibly by a low escarpment. A small black water pond in the middle of this lighter forest. Westward this interfingers with taller forest - the difference is considerable.

Then mostly tall forest, again with the yellow flowering tree. Then a meandering narrow river channel and some cut off meander, some wet grassland, perhaps floating. Several new clearings on north bank of this. ~~Possibly~~ ~~then~~ Low patches of low dense forest, almost scrub, lighter dull green. Tall forest mottled with trees in various stages of leafing out, some red - possibly in flower.

9.03 E How many channels in confused arrangement, mostly

wet grassland. Here inundated & grad with small trees.

Then rather irregular tall forest. A few clearings, possibly slash-and-burn. Also some that are clearly wet grassland. Scattered ponds.

Westward more ponds surrounded by a scrub vegetation. Patches of this scrub may mark location of former ponds. This pattern of ponds, scrub and forest more marked westward. Boundaries between scrub and forest become sharp. The scrub seems to be in water. Still farther west the scrub becomes more of a wet savanna with scattered ~~bush~~ bare trees and low bushes or partly grass.

F 9.11 Then we cross the Solimões which is wide here.

G Small islands ~~east~~ south east of Tefe have wet scrub in interior, forest on periphery, narrow & wide. A few houses on banks. Some patches of wet grassland on east end of Ilha Paraviri, some hills or partly filled cross channels running southeast. Areas of wet savanna in interior. Low ponds and wet grassland.

H

swamp forest around Lago Tefe very mottled with trees in all stages of leafing out.
Tefe is a substantial town, some ~~pale tan~~ ~~with clearings~~ around shores of Lago Tefe.
Left Tefe about 10.a southalong lake, then at considerable altitude out over forest. Cumulus clouds make poor visibility, but forest seems uninterrupted.
Thus for 35 minutes, then a small exceedingly meandering river at right angles to course.
And a single meander of one farther ahead, to right, thus one road in place, possibly to Juruá - more meanders, a large very muddy reddish river - certainly R. Juruá. Dense forest except possibly a few clearings along river. Some cut off side meanders or ox bow lakes, or perhaps other channels, as they are rather muddy. Then a lake. Then a large muddy ox bow, then one not muddy and with grass along the edges. The river has narrow bare muddy banks.
10.53 Crossed R Juruá
A few narrow winding very muddy tributaries or channels in forest and a large muddy ox bow.

Channels and oxbows mostly muddy in dense forest along the north side of Rio Juruá toward Caruari
11:16 Local areas of dense lower scrubby forest or swamp but not frequent.
11:22 a few small cleanings, show a little relief and reddish soil.
Travelling at lower altitude.
Forest quite mixed, many trees leafless or leafing out, closely mottled appearance.
Much shifting cultivation locally as we approach Caruari at a fairly low altitude.
Landed on Rio Juruá. Sandy banks about 6-8 m. high, forest almost down to banks, a narrow strip of grass at top of bank. The forest looks rather scrubby, probably secondary but some palms and merchantable timber trees. Very dense, about 30 m. tall.
The sand must have some clay as the cut banks in places stand up almost vertically, seems to be irregularly bedded pure pinkish tan colored alluvium. Large sand bar mostly bare River 100-150 m. (?) wide.
11:40 Taken off Considerable slightly equatorial locally near Caruari

N Unbroken forest for a considerable distance.

11.97 Altitude and haze cut visibility to practically zero.

11.98 Meandering river (Rio Bita) in dense forest, crossing course at

O bout 100° to right, not very large, but muddy. Visibility very poor, but forest still seems unbroken.

12.40 Only a few scattered cumulus

P clouds now, less haze but travelling at very high altitude. The forest seems uninterrupted

12.52 Coming down to slightly lower

Q altitude - still unbroken forest. Cumulus clouds increasing. There seems to be some slight relief here, but not much.

R 1.05 Forest noticeably mottled by bare emergent ~~trees~~ & canopy trees

1.08 & fairly extensive clearing

S on right. & river on left (Rio Pilao?) A couple of small clearings, one being burned

1.11 Then rather extensive cloud

T land under plane, forest to north, river to south. (Rio Juma) River extremely meandering, still fairly large, many oxbows, there muddy. Low

wood sand bars on convex sides.

Forest very dense, mottled brownish green, scattered yellow flowered trees.

Regrown clearings occasional, evidence of early shifting cultivation.

Many emergents in forest. Many palms, mostly in canopy.

Cultivation of sugar cane and bananas, and ~~Euterpe (açaí berry)~~

Small town with grassy air strip (Pirás) & Vegetation on west side of air strip, a (Pirás) ragged secondary forest in which palms are prominent. Cecropia ~~much~~ ~~slugs eaten~~ ~~trees per unit area~~ ~~less~~ so. On other side are ~~in~~ grasses and cultivated patches for ca 1 km. or more. Many patches ~~are~~ recently burned.

7.16 left Eunápi

A 7.05 Occasional clearings, otherwise dense forest. These ~~(?)~~ apparently on slight ridges transverse course, but a large one close to town is ~~at~~ on flat ground. The relief is slight but noticable

7.12 Group of small clearings, then what

B appears to be a savanna, too close to course to see well. Casinaña.

2:19 Large muddy meandering river
C with clearings (a savanna)
on west side some extending
a distance from bank.
Otherwise forest. Some ox bow lakes and
traces of old channels.
Then gaining altitude, a slight
haze cut visibility to nearly zero.
Scattered cumulus clouds.

2:30 A large area that looks
D like savanna west of
an extremely meandering muddy
river with many and complex oxbows.
Can not see it well but it is
sharply demarked from the forest.

2:40 At least one small channel
E lined for a way with grass clearing.
Following now with meandering
river on the right at some distance.
Still many ox bows, some very
muddy, some not. Some are
choked with vegetation.

2:45 Those large groups of clearing on west
F side of river. Ox bows now mostly
not muddy.

2:50 A few small clearings, otherwise
G the meandering river with its ox bows
in the midst of a tremendous forest.
The meanders have sand bars
on the convex sides when they are
close enough to be seen that well.

3:00 Large cumulus clouds rather abundant.
H Left the river far to the right, still
visible.

3:10 Approaching river again at a lower
I altitude. Meanders very
noticeable, ~~and~~ with pink
sand bars on the convex sides.
An oxbow that is practically
circular filled in, one end
with low woods, the other
with grass. The oxbow lake
not muddy.

3:14 Several clearings along river.

3:17 Clearings and some signs
of old ones away from the
river. Then more and more
cleared land and abandoned
cleared land. The whole
area has been cleared
except small ravines and
steep places. An area some
miles across, at least north
of the river. Cruzeiro do Sul
(Lotus) is a irregular high
ground, perhaps 70 m. above the
river.

Active clearing going on.
Around the airport are thickets
and much tall herbaceous
cover - this of Pteridium, Urena,
a gigantic form of Vida rhombifolia
or something similar, and several
tall grasses - a Paspalum, an Andropogon,
what looks like a Panicum,
and the smell of Melinis is
very strong but none seen.
The herbaceous growth is 1-3 m. tall.

19 200